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FISHES

BY

J. R. NORMAN

(*Department of Zoology, British Museum [Natural History]*)

WITH FORTY-ONE TEXT-FIGURES

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CONTENTS

PAGE

INTRODUCTION 1
SYSTEMATIC ACCOUNT 8

INTRODUCTION

THIS valuable collection of fishes consists of about 2700 specimens, exclusive of a small number of larval and post-larval forms which have been omitted from this report. Altogether 276 species are represented, of which 28 are believed to be new to science, and 56 were previously unrepresented in the British Museum collection. The fishes were obtained in the Red Sea, Gulf of Aden, South Arabian Coast, Gulf of Oman, Arabian Sea, and in the Zanzibar and Maldive areas. The " Valdivia " made collections in the deep water off the east coast of Africa, and the " Investigator " made a few hauls in the Arabian Sea ; generally speaking, however, the area covered by the " John Murray " Expedition may be said to have been largely unexplored, at least as far as the fishes of the deeper water are concerned.

As might be expected, a number of fishes originally obtained by Colonel Alcock in the Bay of Bengal, Andaman Sea and elsewhere, as well as some collected by the " Siboga " in the East Indian region and by the "Albatross " in the neighbourhood of the East Indies and Philippines, have made their appearance in the present collection. The occurrence of certain deep-water fishes in the Zanzibar region and the Gulf of Aden, previously reported only from the Philippines and adjacent seas, may appear at first sight somewhat surprising, but I am convinced that more extensive collecting in the intervening areas of the Indian Ocean would show that most of these forms have a wide range in this part of the world.

I wish to take this opportunity of tendering my thanks to Lt.-Col. R. B. Seymour Sewell, C.I.E., F.R.S., and to the members of the Committee of the John Murray Expedition for their kindness in placing this valuable material in my hands and entrusting me with

the preparation of this report. I am also greatly indebted to various gentlemen who have lent me type-specimens or other material, or who have kindly supplied me with notes upon fishes in collections under their care. My best thanks are offered in this connection to Dr. Rolf Bolin, of the Hopkins Marine Station, California ; Dr. L. F. de Beaufort, of Amsterdam ; Dr. S. L. Hora, of Calcutta ; Dr. F. P. Koumans, of Leiden ; Dr. G. S. Myers, of Stanford University, California ; Prof. J. Pellegrin, of Paris ; Mr. Leonard P. Schultz, of Washington ; and Dr. Å. V. Tåning, of Copenhagen. Finally, I have to express my thanks to my colleague, Dr. Ethelwyn Trewavas, for her assistance in the preparation of alizarin-stained skeletons of certain specimens of eels, and to Lt.-Col. W. P. C. Tenison, D.S.O., for the care that he has taken in the execution of the figures illustrating this report.

Here follows a list of the species collected by the Expedition :

Scyliorhinus (*Halœlurus*) *quagga* (Alcock). Gulf of Aden.
S. (H.) melanostigma, sp. n. Zanzibar Area.
S. (*H.*) *indicus*, Brauer. Gulf of Aden.
S. (*Cephaloscyllium*) *sufflans*, Regan. Gulf of Aden.
Eugaleus omnaensis, sp. n. Gulf of Oman.
Eridacnis radcliffei, Smith. Gulf of Aden.
Spinax lucifer (Jordan & Snyder). Zanzibar Area.
Narcine indica, Henle. Gulf of Aden.
Heteronarce mollis (Lloyd). Gulf of Aden.
Raja powelli, Alcock. Gulf of Aden.
R. johannis-davisi, Alcock. Gulf of Aden.
Raja sp. Gulf of Aden ; Zanzibar Area.
Harriotta (?) *indica* (Garman). Gulf of Aden.
Rouleina guentheri (Alcock). Gulf of Aden.
Xenodermichthys copei, Gill. Gulf of Aden ; Zanzibar Area.
Alepocephalus bicolor, Alcock. Gulf of Aden.
Bajacalifornia burragei, Townsend & Nichols. Gulf of Aden.
Nansenia grœnlandica (Reinhardt). Zanzibar and Maldive Areas.
Gonostoma elongatum, Günther. Arabian Sea.
Cyclothone signata, Garman. Gulf of Aden ; Arabian Sea.
C. pallida, Brauer. Gulf of Aden ; Gulf of Oman ; Arabian Sea ; Maldive Area.
C. acclinidens, Garman. Gulf of Aden ; Gulf of Oman ; Arabian Sea.
Yarrella corythœola (Alcock). Gulf of Aden ; Zanzibar and Maldive Areas.
Vinciguerria nimbaria (Jordan & Williams). Gulf of Oman ; Arabian Sea.
Diplophos tœnia, Günther. Arabian Sea.
Ichthyococcus ovatus (Cocco). Arabian Sea.
Argyropelecus affinis, Garman. Gulf of Aden ; Arabian Sea ; Maldive Area.
A. sladeni, Regan. Zanzibar Area ; Arabian Sea.
Sternoptyx diaphana, Hermann. Arabian Sea ; Zanzibar and Maldive Areas.
Polyipnus nuttingi, Gilbert. Zanzibar Area.
Astronesthes martensii, Klunzinger. Arabian Sea.
Diplolychnus mononema, Regan & Trewavas. Zanzibar Area.
Chauliodus sloanei, Schneider. Zanzibar and Maldive Areas.
C. pammelas, Alcock. Gulf of Aden ; Gulf of Oman ; Arabian Sea ; Maldive Area.

Stomias affinis, Günther. Red Sea ; Arabian Sea.
S. nebulosus, Alcock. Zanzibar Area.
Idiacanthus fasciola, Peters. Zanzibar Area.
Malacosteus niger, Ayres. Gulf of Aden ; Arabian Sea.
Synodus variegatus (Lacepède). Gulf of Aden.
S. indicus (Day). Gulf of Aden.
Saurida tumbil (Bloch). Gulf of Aden.
S. undosquamis (Richardson). Red Sea ; Gulf of Aden ; Gulf of Oman ; Zanzibar Area.
S. longimanus, sp. n. Gulf of Oman.
Chlorophthalmus agassizi, Bonaparte. Zanzibar Area.
C. bicornis, sp. n. Gulf of Aden.
Bathymicrops sewelli, sp. n. Arabian Sea.
Bathypterois atricolor, Alcock. Gulf of Aden.
Ipnops murrayi, Günther. Zanzibar Area.
Scopelengys tristis, Alcock. Arabian Sea.
Neoscopelus macrolepidotus, Johnson. Zanzibar and Maldive Areas.
Myctophum pterotum (Alcock). Gulf of Oman ; Arabian Sea.
M. fibulatum, Gilbert & Cramer. Arabian Sea.
M. laternatum, Garman. Arabian Sea.
M. reinhardti, Lütken. Arabian Sea.
Lampanyctus macropterus, Brauer. Gulf of Aden ; Arabian Sea.
L. alatus, Goode & Bean. Arabian Sea ; Zanzibar Area.
Lampanyctus sp. Gulf of Aden ; Arabian Sea ; Maldive Area.
Diaphus luetkeni, Brauer. Arabian Sea.
D. rafinesquei (Cocco). Gulf of Aden ; Arabian Sea.
D. cæruleus (Klunzinger). Gulf of Aden.
D. splendidus (Brauer). Arabian Sea ; Maldive Area.
D. garmani, Gilbert. Arabian Sea.
Diaphus sp. Gulf of Aden ; Arabian Sea ; Maldive Area.
Ateleopus natalensis, Regan. Zanzibar Area.
A. indicus, Wood-Mason & Alcock. Maldive Area.
Ditropichthys storeri (Goode & Bean). Maldive Area.
Gymnothorax pictus (Ahl). South Arabian Coast.
Serrivomer microps (Alcock). Zanzibar and Maldive Areas.
Avocettinops schmidti, Roule & Bertin. Zanzibar Area.
Gavialiceps tæniola, Alcock. Gulf of Aden ; South Arabian Coast ; Maldive Area.
Venefica proboscidea (Vaillant). Arabian Sea.
Conger maldivensis, sp. n. Maldive Area.
Ariosoma guttulata (Günther). Gulf of Aden ; South Arabian Coast ; Maldive Area.
A. nigrimanus, sp. n. Gulf of Aden.
Ariosoma sp. South Arabian Coast ; Zanzibar Area.
Bathyuroconger braueri (Weber & Beaufort). Maldive Area.
Uroconger lepturus (Richardson). Gulf of Oman.
Coloconger raniceps, Alcock. South Arabian Coast ; Zanzibar Area.
Ophichthus multiserialis, sp. n. Gulf of Aden.
Sphagebranchus omanensis, sp. n. Gulf of Oman.

Dysomma zanzibarensis, sp. n. Zanzibar Area.
Synaphobranchus (*Synaphobranchus*) *brevidorsalis*, Günther. Zanzibar and Maldive Areas.
S. (*Histiobranchus*) *bathybius*, Günther. Zanzibar Area.
Notacanthus indicus, Lloyd. South Arabian Coast.
Halosaurus parvipennis, Alcock. Gulf of Aden ; Maldive Area.
Aldrovandia affinis (Günther). Zanzibar and Maldive Areas.
Parexocœtus brachypterus (Richardson). Red Sea.
Exocœtus volitans, Linnæus. Arabian Sea.
Hirundichthys affinis (Günther). Arabian Sea.
Fistularia villosa, Klunzinger. Maldive Area.
Halicampus koilomatodon (Bleeker). Gulf of Aden.
Bathygadus furvescens, Alcock. Gulf of Aden ; Maldive Area.
B. spongiceps, Gilbert & Hubbs ? Zanzibar Area.
Gadomus multifilis (Günther). Gulf of Aden ; Zanzibar and Maldive Areas.
Macrouroides inflaticeps, Smith & Radcliffe. Maldive Area.
Odontomacrurus murrayi, gen. and sp. n. Arabian Sea.
Cœlorhynchus (*Quincuncia*) *argentatus*, Smith & Radcliffe. Zanzibar Area.
C. (*Oxymacrurus*) *quadricristatus* (Wood-Mason & Alcock). Maldive Area.
Coryphœnoides lophotes (Alcock) ? Gulf of Aden.
Hymenocephalus heterolepis (Alcock). Gulf of Aden ; Zanzibar and Maldive Areas.
Malacocephalus lævis (Lowe). Zanzibar and Maldive Areas.
Ventrifossa petersonii (Alcock). Zanzibar and Maldive Areas.
Lionurus polylepis (Alcock). Zanzibar Area.
Matœocephalus microstomus (Regan). Zanzibar and Maldive Areas.
Bregmaceros maclellandi, Thompson. Gulf of Aden ; Gulf of Oman ; South Arabian Coast ; Arabian Sea.
Physiculus peregrinus (Günther). Zanzibar Area.
P. roseus, Alcock. Gulf of Aden.
P. edelmanni, Brauer. Zanzibar Area.
Diretmus argenteus, Johnson. Arabian Sea.
Hoplostethus (*Hoplostethus*) *mediterraneus*, Cuvier & Valenciennes. Gulf of Aden ; Zanzibar Area.
H. (*Leiogaster*) *melanopus* (Weber). Zanzibar and Maldive Areas.
Melamphaes robustus, Günther. Arabian Sea.
M. megalops, Lütken. Arabian Sea.
M. mizolepis, Günther. Arabian Sea.
Zen scutatus (Gilchrist & von Bonde). Maldive Area.
Ostracoberyx dorygenys, Fowler. Zanzibar and Maldive Areas.
Epinephelus præopercularis, Boulenger. Gulf of Oman.
Epinephelus sp. Gulf of Aden.
Chelidoperca investigatoris (Alcock). South Arabian Coast.
Anthias squamipinnis (Peters). Red Sea.
A. cooperi, Regan. Gulf of Aden.
Acropoma japonicum, Günther. Gulf of Oman.
Priacanthus hamrur (Forskål). Gulf of Aden ; Arabian Sea.
Apogon (*Apogonichthys*) *auritus*, Cuvier & Valenciennes. Maldive Area.

A. (*A.*) *ellioti*, Day. Gulf of Oman.
A. (*Apogon*) *monochrous*, Bleeker. Gulf of Aden.
A. (*A.*) *maximus*, Boulenger. South Arabian Coast.
A. (*A.*) *quadrifasciatus*, Cuvier & Valenciennes. Gulf of Aden.
Oxyodon macrops, Brauer. Zanzibar Area.
Synagrops japonicus (Steindachner & Döderlein). Zanzibar and Maldive Areas.
S. philippinensis (Günther). Gulf of Aden ; Gulf of Oman.
Branchiostegus doliatus (Cuvier & Valenciennes). Zanzibar Area.
Bathyclupea hoskynii, Alcock. Gulf of Aden.
B. malayana, Weber. Zanzibar Area.
Naucrates ductor (Linnæus). Arabian Sea.
Coryphæna equisetis, Linnæus. Gulf of Oman.
Dipterygonotus leucogrammicus, Bleeker. Gulf of Oman.
Nemipterus japonicus (Bloch). Red Sea.
Parascolopsis townsendi, Boulenger. Gulf of Aden ; Gulf of Oman ; Arabian Sea.
Leiognathus insidiator (Bloch). Gulf of Aden.
L. bindus (Cuvier & Valenciennes). Gulf of Aden.
L. lineolatus (Cuvier & Valenciennes). Gulf of Aden.
Gazza minuta (Bloch). Gulf of Aden.
Pomadasys stridens (Forskål). Red Sea.
Parupeneus fraterculus (Cuvier & Valenciennes). Gulf of Aden.
Upeneus bensasi (Schlegel) ? Red Sea.
Platax orbicularis (Forskål). Red Sea.
Chætodon jayakari, sp. n. Gulf of Aden ; South Arabian Coast.
C. gardineri, sp. n. Gulf of Aden.
Histiopterus spinifer, Gilchrist. Gulf of Aden.
Lepidaplois trilineatus, Fowler. Gulf of Aden.
Champsodon omanensis, Regan. Gulf of Aden ; Gulf of Oman ; Arabian Sea.
C. capensis, Regan. Zanzibar Area.
Stalix omanensis, sp. n. Gulf of Oman.
Parasphenanthias weberi, Gilchrist. Zanzibar Area.
Bembrops platyrhynchus (Alcock). Gulf of Aden.
Bembrops adenensis, sp. n. Gulf of Aden.
B. nematopterus, sp. n. Zanzibar Area.
Uranoscopus archionema, Regan. Zanzibar Area.
U. crassiceps, Alcock. Gulf of Aden.
Pseudoscopelus cephalus, Fowler ? Arabian Sea.
Siganus nebulosus (Quoy & Gaimard). Red Sea.
Aphanopus microphthalmus, sp. n. Gulf of Aden.
[*Gobius*] *cometes*, Alcock. Gulf of Aden.
Oplopomus caninoides (Bleeker). Gulf of Aden.
Gnatholepis sp. Zanzibar Area.
Callionymus carebares, Alcock. Gulf of Aden ; Gulf of Oman ; Arabian Sea.
C. kaianus, Günther. Zanzibar Area.
C. maldivensis, Regan. Gulf of Aden.
C. filamentosus, Cuvier & Valenciennes. South Arabian Coast.

C. bicornis, sp. n. Zanzibar Area.
Callionymus sp. South Arabian Coast.
Synchiropus altivelis, Regan. Gulf of Aden.
Petroscirtes mitratus, Rüppell. Gulf of Aden.
P. ancylodon, Rüppell. Gulf of Aden.
Neobythites steatiticus, Alcock. Gulf of Aden ; Zanzibar Area.
Monomitopus nigripinnis (Alcock). Zanzibar Area.
Dicrolene introniger, Goode & Bean. South Arabian Coast.
D. longimana, Smith & Radcliffe. Gulf of Aden.
D. multifilis (Alcock). Zanzibar Area.
D. nigrocaudis (Alcock). Gulf of Aden ; Maldive Area.
Bassobythites brunswigi, Brauer. Maldive Area.
Bassozetus glutinosus (Alcock). Gulf of Aden.
Porogadus trichiurus (Alcock). Gulf of Aden ; Zanzibar Area ; Arabian Sea.
Glyptophidium mcropus, Alcock. Gulf of Aden.
G. longipes, sp. n. Zanzibar Area.
Lamprogrammus niger, Alcock. Zanzibar and Maldive Areas.
L. fragilis, Alcock. Gulf of Aden ; South Arabian Coast.
Pycnocraspedum squamipinne, Alcock. Zanzibar Area.
Luciobrotula bartschi, Smith & Radcliffe. Gulf of Aden.
Catœtyx squamiceps (Lloyd). Gulf of Aden.
Grammonus robustus, Smith & Radcliffe. Gulf of Aden.
Diplacanthopoma raniceps, Alcock. Gulf of Aden.
D. brunnea, Smith & Radcliffe. Arabian Sea.
Psenes arafurensis, Günther. Arabian Sea.
P. guttatus, Fowler. Gulf of Oman ; South Arabian Coast.
Cubiceps sp. Gulf of Oman.
Setarches marleyi, Fowler. Zanzibar Area.
Scorpœnopsis cirrhosa (Thunberg). Gulf of Aden.
Phenacoscorpius adenensis, sp. n. Gulf of Aden.
Dendrochirus brachypterus (Cuvier & Valenciennes). Gulf of Aden.
Pterois antennata (Bloch). South Arabian Coast.
Pterois sp. Red Sea.
Snyderina guentheri (Boulenger). Gulf of Aden.
Lepidotrigla omanensis, Regan. Gulf of Aden ; South Arabian Coast.
L. spiloptera, Günther. Zanzibar Area.
Trigla sp. South Arabian Coast.
Peristedion adeni (Lloyd). Gulf of Aden.
P. investigatoris, Alcock. Zanzibar Area.
Minous inermis, Alcock. Gulf of Aden.
Platycephalus townsendi, Regan. Red Sea ; Gulf of Aden ; South Arabian Coast.
P. pristiger, Cuvier & Valenciennes. Gulf of Aden ; Gulf of Oman.
P. nigripinnis, Regan. Gulf of Oman.
Hoplichthys acanthopleurus, Regan. Zanzibar Area.
Dactyloptena orientalis (Cuvier & Valenciennes). Gulf of Aden.
Pegasus draconis, Linnæus. Gulf of Aden.

Leptecheneis naucrates (Linnæus). Gulf of Aden.
Echeneis remora, Linnæus. Arabian Sea.
Pseudorhombus arsius (Hamilton). Gulf of Aden.
Tæniopsetta ocellata (Günther). Zanzibar Area.
Citharoides macrolepis (Gilchrist). Zanzibar Area.
Arnoglossus tapeinosoma (Bleeker). Gulf of Oman.
A. arabicus, sp. n. Gulf of Aden ; South Arabian Coast.
A. dalgleishi (von Bonde). Zanzibar Area.
Engyprosopon grandisquama (Temminck & Schlegel). Gulf of Aden.
E. latifrons (Regan). Red Sea.
E. macrolepis (Regan). Gulf of Aden.
Bothus pantherinus (Rüppell). Gulf of Aden.
Chascanopsetta prognathus, sp. n. Maldive Area
Læops nigrescens, Lloyd. Gulf of Aden.
Pœcilopsetta albomaculata, sp. n. Maldive Area.
P. zanzibarensis, sp. n. Zanzibar Area.
Marleyella bicolorata (von Bonde). Zanzibar Area.
M. maldivensis, sp. n. Maldive Area.
Cynoglossus (*Areliscus*) *carpenteri*, Alcock. Gulf of Oman.
C. (Areliscus) acutirostris, sp. n. Gulf of Aden.
C. (Trulla) zanzibarensis, sp. n. Zanzibar Area.
Symphurus marmoratus, Fowler. Maldive Area.
S. strictus, Gilbert. Maldive Area.
S. macrophthalmus, sp. n. Gulf of Aden.
S. gilesii (Alcock). Gulf of Aden.
S. wood-masoni (Alcock). South Arabian Coast.
Paratriacanthodes herrei, Myers. Zanzibar Area.
Abalistes stellatus (Lacepède). Maldive Area.
Balistapus sp. Zanzibar Area.
Canthidermis sp. Gulf of Aden.
Cantherines granulatus (White). Gulf of Aden.
C. modestoides, Barnard. Gulf of Aden.
Stephanolepis setifer (Bennett). Gulf of Aden (?)
Aluterus scriptus (Osbeck). Gulf of Aden.
Lactoria cornuta (Linnæus). Gulf of Aden.
Rhinesomus gibbosus (Linnæus). Gulf of Aden.
Spheroides hypselogeneion (Bleeker). Gulf of Aden.
Canthigaster cinctus (Solander). Gulf of Aden.
Diodon holacanthus, Linnæus. South Arabian Coast.
Chirolophius mutilus (Alcock). Gulf of Aden ; Zanzibar Area.
Pterophryne histrio (Linnæus). Arabian Coast.
Antennarius sp. Gulf of Aden ; South Arabian Coast.
Chaunax pictus, Lowe. Zanzibar and Maldive Areas.
C. pencillatus, McCulloch. Zanzibar Area.
Halieutæa coccinea, Alcock. Maldive Area.
H. fumosa, Alcock. Gulf of Aden.

Dibranchus nasutus, Alcock. Gulf of Aden.
D. obscurus, Brauer. Gulf of Aden ; Zanzibar Area.
D. nudiventer, Lloyd. Zanzibar Area.
Cœlophrys micropus (Alcock). Gulf of Aden.
Malthopsis triangularis, Lloyd. Maldive Area.
Halicmetus ruber, Alcock. Gulf of Aden ; Maldive Area.
Melanocetus johnsoni, Günther. Zanzibar Area ; Arabian Sea.
Melanocetus sp. Arabian Sea.
Dolopichthys sp. Gulf of Aden.
Chœnophryne sp. Arabian Sea.
Cryptosparas carunculatus (Günther). Gulf of Aden ; Arabian Sea.
Mancalias uranoscopus (Murray). Arabian Sea.

SYSTEMATIC ACCOUNT

Family Scyliorhinidæ.

Scyliorhinus (*Halælurus*) *quagga* (Alcock).

Scyllium quagga, Alcock, 1899, Cat. Indian Deep-sea Fish. p. 17 ; 1900, Illust. Zool. "Investigator", pl. xxvii, figs. 1, 1*a*.
Scyliorhinus quagga, Regan, 1908, Ann. Mag. Nat. Hist. (8) I, p. 461.
Halælurus quagga, Garman, 1913, Mem. Mus. Comp. Zoöl. XXXVI, p. 84.

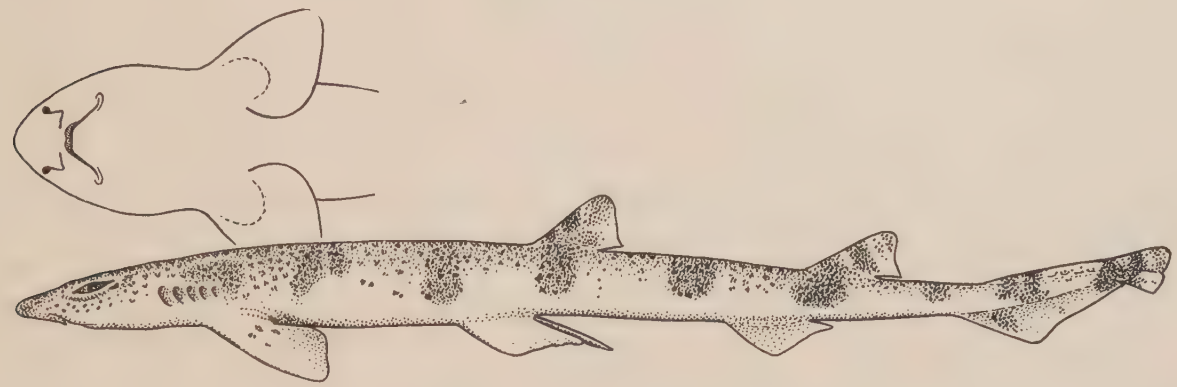
Occurrence :

St. 27, Gulf of Aden, OT, 37–91 m. ; 1 male (460 mm.).

Distribution.—Gulf of Aden, Malabar Coast.

Description.—Head broad, depressed ; snout elliptical, with its tip obtusely pointed, its length (measured from the middle of the upper jaw) about $\frac{1}{2}$ its greatest breadth and $2\frac{1}{3}$ times the width of the interspace between the nasal flaps ; latter nearly rectangular, without cirri, not confluent with the upper lip. Mouth about twice as wide as long ; a labial fold at the angle of the mouth, extending along the lower jaw for less than $\frac{1}{3}$ the distance from the angle to the symphysis, and less than $\frac{1}{2}$ as far along the upper jaw. Teeth with a strong middle cusp, and often with one, two or more very small cusps on either side. First dorsal fin originating above end of base of pelvics ; its base rather more than $\frac{1}{3}$ the distance from second dorsal, which is subequal and originates nearly above end of anal base. Length of base of anal only a little more than that of second dorsal, and $1\frac{3}{4}$ times in its distance from the caudal. Pectoral with rounded angles, extending more than $\frac{1}{2}$ the distance from its origin to that of pelvics ; latter not united. Pale yellowish-brown, the upper parts with numerous small dark spots, which are mostly aggregated into small groups of 3 to 5 spots ; a broad dark cross-band between the hinder parts of the eyes ; a pair of dark patches at the level of the gill-openings, not meeting in the middle line ; another cross-band level with hinder parts of pectorals, an indistinct one just in front of the origin of the pelvics, one below the first dorsal, one between the dorsals, one below the anterior part of the second dorsal, and three others on the tail ; each pectoral with a group of about five somewhat larger spots ; the dark bands below the dorsals are continued on the fins ; anal and pelvics plain.

Remarks.—Apart from a very slight difference in the shape of the snout, the specimen described above differs from the holotype (Ind. Mus. Reg. No. $\frac{751}{1}$) only in the coloration. The latter, which has been lent to me for examination by the Indian Museum, is a male, 290 mm. in total length, from off the Malabar Coast at a depth of about 186 metres. On the back and sides there are numerous well-defined, narrow, dark cross-bands, from the



Text-fig. 1.—*Scyliorhinus* (*Halælurus*) *quagga*. St. 27. × $\frac{1}{3}$.

snout to the tip of the tail, somewhat irregular in breadth and not broken up into spots. Presumably this represents a juvenile coloration, the narrow bands tending to break up with age, and the groups of small dark spots to be developed on the upper parts.

This species is closely related to *Scyliorhinus* (*Halælurus*) *natalensis*, Regan, from Natal, the type of which is in the Britsh Museum, but differs mainly in the more obtuse snout, differently shaped mouth, with shorter labial folds, and in the coloration.

Scyliorhinus (*Halælurus*) *melanostigma*, sp. n.

Occurrence :

St. 105, Zanzibar area, AT, 238–293 m. ; 2 females (190, 205 mm.).

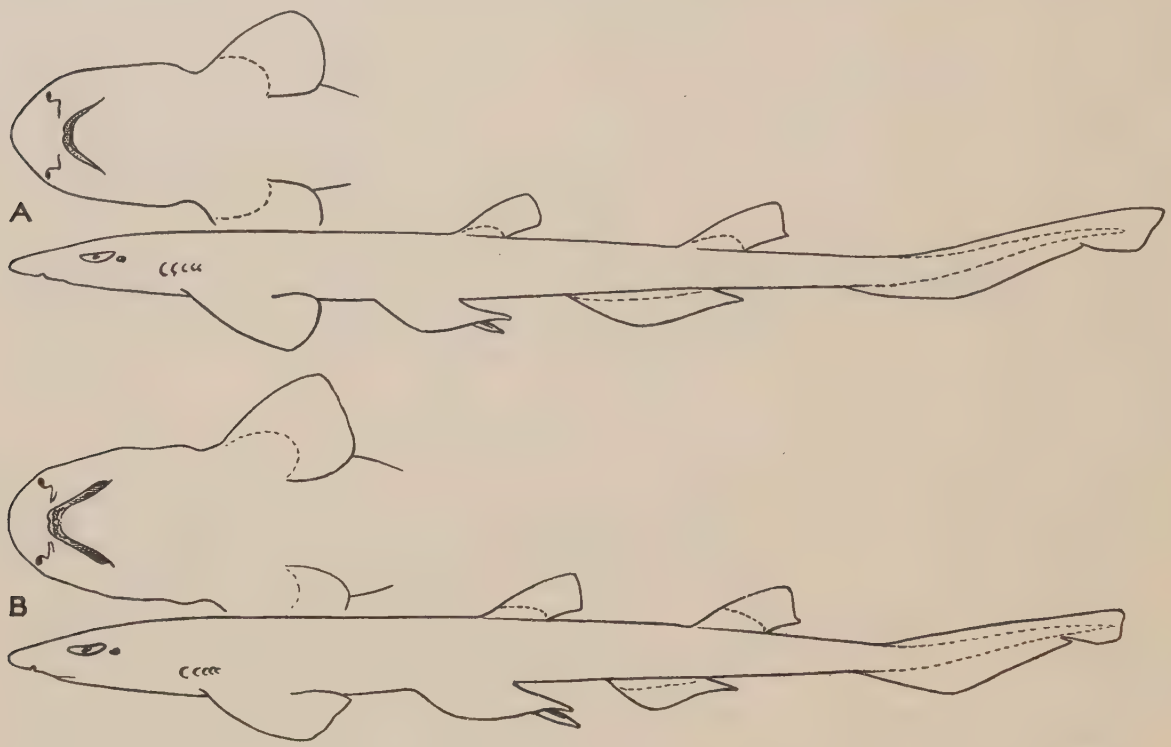
St. 115, Zanzibar area, OT, 640–658 m. ; 3 males (265–330 mm.). Holotype 330 mm.

Distribution.—Near Zanzibar.

Description.—Snout rounded, its præoral length nearly $\frac{3}{4}$ (about $\frac{2}{3}$ in young) the distance between the outer edges of the nasal flaps ; latter nearly rectangular, without cirri, not confluent with the upper lip, separated by an interspace equal to about twice the length of the posterior edge of either. Mouth twice as wide as long ; no labial folds ; upper lip not overlapping lower at angles of mouth. Teeth with a strong median cusp and with two small lateral cusps. Posterior gill-openings smaller and closer together than the anterior. Dermal denticles each with a single, rather slender, curved median cusp. First dorsal fin originating above end of base of pelvics ; its base $\frac{1}{3}$ or less than $\frac{1}{3}$ the distance from second dorsal, which is larger than the first and originates nearly opposite to or a little in front of end of anal base. Length of base of anal $2\frac{3}{4}$ to $3\frac{1}{4}$ times ($2\frac{2}{5}$ to $2\frac{3}{5}$ in young) that of first dorsal, equal to or a little greater than ($1\frac{3}{5}$ to $1\frac{2}{3}$ in this distance in young) its distance from the caudal. Pectoral rounded, extending nearly $\frac{3}{4}$ the distance

from its origin to that of pelvics ; latter united in males for about the basal third of their posterior edges. Upper surface with numerous small, rounded dark spots, which are somewhat enlarged in certain regions, where they form indefinite cross-bands ; in the young there is a narrow elliptical dark spot edged with paler on each dorsal fin.

Remarks.—This species is closely related to *Scyliorhinus* (*Halœlurus*) *polystigma*, Regan, from deep water off the coast of Natal, but differs mainly in the longer snout,



Text-fig. 2.—A. *Scyliorhinus* (*Halœlurus*) *melanostigma*. Holotype. × ½. B. *Scyliorhinus* (*Halœlurus*) *polystigma*. Holotype. × ½.

wider mouth, and distinctly longer anal fin. The relative length of the base of the anal fin appears to increase somewhat with age, but if an example of 330 mm. is compared with the type of Regan's species, which is 320 mm. in length, the difference is at once apparent. Barnard (1925, ' Ann. S. Afric. Mus.' XXI, p. 43) suggests that *S. polystigma* is a synonym of *S. punctatus*, Gilchrist, from deep water off Cape Point, an opinion expressed by Gilchrist himself (1922, ' Rep. Fish. Mar. Biol. Surv.' II, Spec. Rep. III, p. 46). The type of *S. punctatus* is 245 mm. in total length : the length of the base of the anal fin is about $1\frac{3}{4}$ times that of the first dorsal, and $1\frac{4}{5}$ times in its distance from the caudal ; the two dorsal fins are described as being equal in size.

Scyliorhinus (*Halœlurus*) *indicus*, Brauer.

Scyliorhinus indicus, Brauer, 1906, " Valdivia " Tiefsee-Fische, p. 8, pl. xiv, fig. 1 ; Regan, 1908, Ann. Mag. Nat. Hist. (8) I, p. 459 ; Lloyd, 1909, Mem. Ind. Mus. II, p. 139.

Occurrence :

St. 193, Gulf of Aden, AG, 1061–1080 m. ; 1 male (230 mm.)

Distribution.—Off East African coast, Gulf of Aden, Gulf of Oman ; in deep water.

Remarks.—This species was not previously represented in the collection of the British Museum. It is well distinguished from *S.* (*Halælurus*) *hispidus* (Alcock), also from the Indian Ocean, by the longer anal fin, which reaches the base of the caudal, the longer snout, the form of the nasal flaps, etc. The other species of the subgenus *Halælurus* from the region under consideration is *S.* (*Halælurus*) *alcockii* (Garman), which is known only from a single specimen (Ind. Mus. Reg. No. $\frac{68}{1}$), 118 mm. in total length, from the Arabian Sea, 1162 to 1294 metres. This specimen was identified by Alcock as *Scyliorhinus canescens*, Günther.

Scyliorhinus (*Cephaloscyllium*) *sufflans*, Regan.

Scyliorhinus (*Cephaloscyllium*) *sufflans*, Regan, 1921, Ann. Mag. Nat. Hist. (9) VII, p. 413.
Cephaloscyllium sufflans, Fowler, 1935, Proc. Acad. Nat. Sci. Philad. LXXXVII, p. 362, figs. 2, 3.

Occurrence :

St. 24, Gulf of Aden, OT, 73–200 m. ; 1 male (300 mm.), 1 female (268 mm.).

Distribution.—Off Natal coast, Gulf of Aden ; in deep water.

Remarks.—These specimens are in a somewhat poor state of preservation, but I have little doubt that they belong to this species. The holotype, a male, 750 mm. in total length, is from 15 to 22 miles off the mouth of the Umvoti River, Natal, at a depth of 225 to 244 metres.

Family Carcharinidæ.

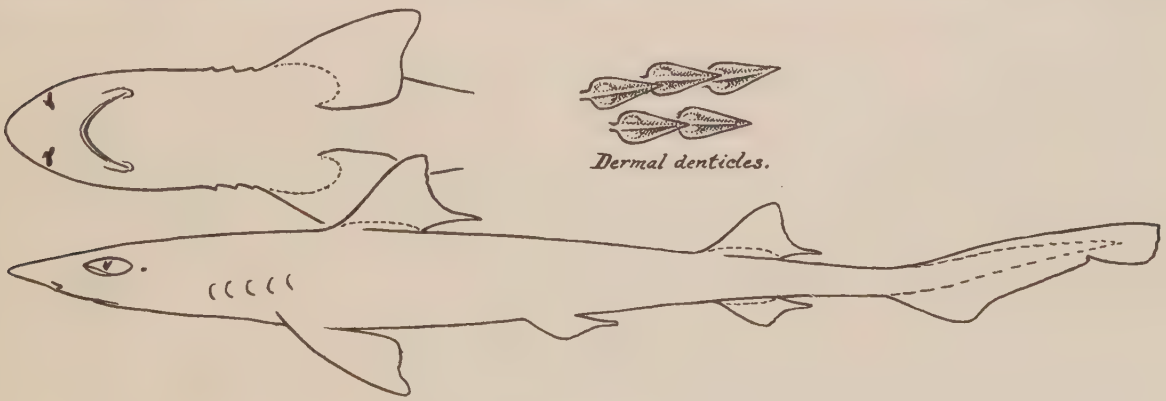
Eugaleus omanensis, sp. n.

Occurrence :

St. 75, Gulf of Oman, OT, 210 m. ; 1 female (280 mm.). Holotype.

Distribution.—Gulf of Oman.

Description.—Head of moderate width, depressed ; snout obtusely pointed, its length (measured from middle of upper jaw) about $\frac{3}{4}$ its greatest breadth and nearly twice



Text-fig. 3.—*Eugaleus omanensis*. Holotype. × $\frac{1}{2}$.

the distance between the inner edges of the nostrils ; anterior nasal valve with two points, an outer and an inner. Eye of moderate size, its longitudinal diameter about $4\frac{1}{2}$ in distance from tip of snout to first gill-cleft ; spiracle very small. Mouth more than $1\frac{1}{2}$ times as broad as long, with labial folds at the angles, the upper fold much longer than the lower.

Teeth alike in both jaws, all oblique, inclined towards angles of mouth ; anterior margin of each tooth straight, smooth, posterior margin deeply notched ; about 44 rows in upper and 38 in lower jaw. Dermal denticles small, spear-shaped, each with a single pointed cusp. First dorsal fin originating above posterior part of pectoral base ; its base nearly 3 times in the distance from the second dorsal, which is smaller and originates a little in advance of anal. Length of anal base about $\frac{2}{3}$ that of second dorsal, $1\frac{1}{2}$ times in its distance from the caudal. Pectoral extending more than $\frac{1}{2}$ the distance from its origin to that of pelvics ; latter originating in advance of middle of total length. Subcaudal lobe slight. Uniformly greyish-brown above, paler below ; tips of dorsal and caudal fins blackish.

This species is well distinguished from the other members of the genus by the form of the teeth and by the absence of a marked subcaudal lobe, but I have hesitated to erect a new genus on this account. It cannot be a *Hemigaleus*, as the teeth are alike in the two jaws and there is no trace of a pit at the root of the caudal fin.

Eridacnis radcliffei, Smith.

Eridacnis radcliffei, Smith, 1913, Proc. U.S. Nat. Mus. XLV, p. 599, pl. xlvii, text-figs. 1–3.

Occurrence :

St. 24, Gulf of Aden, OT, 73–200 m. ; 1 female (162 mm.).

St. 194, Gulf of Aden, AT, 220 m. ; 3 females (200–220 mm.).

Distribution.—Sulu Archipelago, Philippines ; Gulf of Aden : in deep water.

Remarks.—The occurrence of this shark in the Gulf of Aden is of some interest. Dr. Leonard P. Schultz, of the United States National Museum, has been kind enough to compare one of the above-mentioned specimens with the type of the species (U.S.N.M. Cat. No. 74604), a female, 230 mm. long, captured off Jolo light, Island of Jolo, at a depth of 295 metres. He writes that " the head of *radcliffei* appears to be slightly blunter and broader and possibly a little deeper than the specimen which you sent. I do not see any marked difference between your specimen and the one that Smith described ".

Family Squalidæ.

Spinax lucifer (Jordan & Snyder).

Occurrence :

St. 115, Zanzibar area, OT, 640–658 m. ; 1 male (300 mm.), 1 female (270 mm.).

Distribution.—South Africa, Natal, near Zanzibar, Japan ; in deep water.

Family Torpedinidæ.

Narcine indica, Henle.

Occurrence :

St. 27, Gulf of Aden, OT, 37–91 m. ; 1 male (280 mm.).

Distribution.—Gulf of Aden, Indian Seas.

Heteronarce mollis (Lloyd).

Narcine mollis, Lloyd, 1907, Rec. Ind. Mus. I, p. 8 ; Annandale, 1909, Mem. Ind. Mus. II, p. 43, pl. iii*a*, figs. 3, 3*a* ; Lloyd, 1909, Mem. Ind. Mus. II, p. 144 ; Illust. Zool. " Investigator ", pl. xlvi, figs. 1, 1*a*.

Occurrence :

St. 24, Gulf of Aden, OT, 73–200 m. ; 1 female (195 mm.).

Distribution.—Gulf of Aden ; in deep water.

Remarks.—This specimen agrees very well with the description of the types, which were taken in the Gulf of Aden, at a depth of 346 metres, but the lower surface is white instead of greyish-brown. Lloyd does not mention the size of the two specimens upon which his description was based, but Dr. S. L. Hora informs me that the holotype in the Indian Museum (Reg. No. $\frac{1456}{1}$) is a male, 225 mm. in total length. *Heteronarce mollis* is well distinguished from *H. garmani*, Regan, from Natal, of which *Narcine natalensis*, Fowler, is a synonym, by the much larger eyes and spiracles, shorter snout, and larger mouth and nasal valves.

Family Rajidæ.

Raja powelli, Alcock.

Raja powelli, Alcock, 1898, Ann. Mag. Nat. Hist. (7) II, p. 145 ; 1899, Cat. Indian Deep-sea Fish. p. 20 ; Illust. Zool. " Investigator ", pl. xxvi, fig. 4.

Raia philipi, Lloyd, 1906, Ann. Mag. Nat. Hist. (7) XVIII, p. 309 ; 1908, Illust. Zool. " Investigator ", pl. xl, pl. xli, fig. 1 ; 1909, Mem. Ind. Mus. II, p. 142, fig. 1*c*.

Occurrence :

St. 194, Gulf of Aden, AT, 220 m. ; 1 male (350 : 210 mm. across disc.), 1 female (345 : 220 mm. across disc).

Distribution.—Gulf of Aden, Travancore coast, Gulf of Martaban.

Description.—Disc a little broader than long, its width about $\frac{3}{5}$ or $\frac{2}{3}$ of the total length ; anterior margins a little undulated ; outer angles rounded or obtusely pointed. Vent equidistant from tip of snout and end of tail, or a little nearer to the former. Snout produced, rather acutely pointed, its length $3\frac{4}{5}$ to $4\frac{1}{4}$ in width of disc. Diameter of eye $\frac{2}{3}$ to $\frac{4}{5}$ interorbital width ; eye + spiracle $2\frac{1}{3}$ to $2\frac{3}{4}$ in præorbital length of snout. Internasal width 2 to $2\frac{1}{3}$ in præoral length of snout. 56 to more than 70 rows of teeth. Upper surface of disc mainly smooth, but with a patch of spinules on the tip of the snout and some more along the anterior edges of the pectorals ; sometimes some scattered spinules on the snout ; 2 to 4 præocular and 1 to 3 postocular spines ; 1 or 2 spines on the back in the suprascapulary region, united with or separated from a row of from 3 to 6 median nuchal spines ; 2 or 3 irregular series of spines on the back of the tail, which may extend anteriorly on to the hinder part of the disc ; edges of tail with 2 or 3 series of rather small, hook-like spinules. Lower surface quite smooth, except for rough areas at edges of snout and anterior parts of pectoral fins. Brownish ; snout paler ; a large round ocellus near the middle of the base of each pectoral ; lower surface pale.

Remarks.—In addition to the two specimens collected by the present expedition, the above description includes the type of the species (Ind. Mus. Reg. No. $\frac{235}{1}$), a female, 318 mm. in total length (190 mm. across the disc), from the Gulf of Martaban, at a depth of 122 metres ; the type of *R. philipi* (Reg. No. $\frac{1383}{1}$), a male, 360 mm. in total length (230 mm. across the disc), from the Gulf of Aden, at a depth of about 244 metres ; and

another specimen (Reg. No. $\frac{2708}{1}$), a female, 475 mm. in total length (315 mm. across the disc), from Trivandrum, Travancore coast, in shallow water ; lent to me for examination by the Indian Museum. I have little doubt that all these specimens belong to a single somewhat variable species.

Raja johannis-davisi, Alcock.

Raja johannis-davisi, Alcock, 1899, Cat. Indian Deep-sea Fish. p. 21 ; 1900, Illust. Zool. " Investigator ", pl. xxvii, fig. 2.

Occurrence :

St. 35, Gulf of Aden, OT, 457–549 m. ; 1 female (340 : 230 mm. across disc).

Distribution.—Near Zanzibar (?), Gulf of Aden, Travancore coast.

Description.—Disc broader than long, its width about $\frac{2}{3}$ of the total length ; anterior margins a little undulated ; outer angles obtusely pointed. Vent a very little nearer to end of tail than to tip of snout. Snout produced, acutely pointed, its length about $3\frac{3}{5}$ in width of disc. Diameter of eye about equal to interorbital width ; eye + spiracle $3\frac{1}{2}$ in præorbital length of snout. Internasal width $2\frac{1}{2}$ in præoral length of snout. About 36 rows of teeth. Both surfaces of disc quite smooth, except for small spinules on the lower surface of the rostral cartilage, and of the edges of the snout and adjacent parts of the pectoral fins ; 2 or 3 præocular and 2 postocular spines ; no nuchal or scapulary spines ; a median row of 21 spines from base of pelvics to first dorsal fin ; no other spines on the tail. Dark brown ; lower surface similarly coloured.

Remarks.—There seems little doubt that this specimen is referable to Alcock's species, which was described from a single male specimen, 210 mm. in length, from off the Travancore coast, at a depth of 420 to 532 metres (Indian Mus. Reg. No. $\frac{477}{1}$). The " very strong spine in the middle of the nape " is here wanting, but this may be lost with age or confined to the males.

The following young specimen from near Zanzibar may belong to this species. The snout is proportionately longer ; there are two præocular and one postocular spine, which are stronger than those of the specimen from the Gulf of Aden ; there is a single strong nuchal spine ; the row of spines on the tail is composed of 18 ; the lower surface is paler and is dotted with black.

St. 115, Zanzibar area, OT, 640–658 m. ; 1 female (185 : 105 mm. across disc).

Raja sp.

Occurrence :

St. 34, Gulf of Aden, AT, 1022 m. ; 1 egg-capsule.

St. 119, Zanzibar area, AT, 1207–1463 m. ; 1 egg-capsule.

Family Chimæridæ.

Harriotta (*?*) *indica* (Garman).

Callorhynchus ?, sp., Wood-Mason & Alcock, 1891, Ann. Mag. Nat. Hist. (6) VIII, p. 21, fig. 1.
Callorhynchus indicus, Garman, 1899, Mem. Mus. Comp. Zoöl. XXIV, p. 21.
Harrotta (*?*) *indica*, Dean, 1906, Chimæroid Fish. and their Devel., p. 30.

Occurrence :

St. 193, Gulf of Aden, AT, 1061–1080 m. ; 1 egg-capsule.

Distribution.—Gulf of Aden, Bay of Bengal ; in deep water.

Remarks.—This capsule, which measures about 160 mm. in length, agrees closely with that described and figured by Alcock from the Bay of Bengal (13° 47′ 30″ N., 92° 36′ 00″ E.), at a depth of 1050 metres. This last, which is in the Indian Museum, has been examined by Dean, who has expressed the opinion that it belongs to a species of *Harriotta*. The parent fish has not yet been recognized, but the egg-capsule may be provisionally referred to that genus. Another Chimæroid capsule has been described by Sewell (1912, 'Rec. Ind. Mus.' VII, p. 2) from off the south-west coast of India (9° 14′ 10″ N., 75° 45′ 00″ E.), at a depth of about 445 metres, and referred by him to the genus *Rhinochimæra*.

Family Alepocephalidæ.

Rouleina guentheri (Alcock).

Xenodermichthys guentheri, Alcock, 1892, Ann. Mag. Nat. Hist. (6) X, p. 359, pl. xviii, fig. 3 ; 1899, Cat. Indian Deep-sea Fish. p. 180 ; 1900, Illust. Zool. " Investigator ", pl. xxxii, fig. 2.

Occurrence :

St. 34, Gulf of Aden, AT, 1022 m. ; 1 (*c.* 140 mm.).

St. 193, Gulf of Aden, AT, 1061–1080 m. ; 2 (110, 145 mm.).

Distribution.—Gulf of Aden, Arabian Sea, Bay of Bengal.

Remarks.—These specimens are all in poor condition, but appear to be referable to this species.

Xenodermichthys copei, Gill.

Occurrence :

St. 35, Gulf of Aden, OT, 457–549 m. ; 5 (100–132 mm.).

St. 115, Zanzibar area, OT, 640–658 m. ; 1 (76 mm.).

Distribution.—Atlantic, near Zanzibar, Gulf of Aden.

Remarks.—These specimens are not in good condition. I have compared them with two co-types of *X. socialis*, Vaillant, from Banc d'Arguin, 1090 metres, received from the Paris Museum. There are minor differences in the shape of the head, length of the snout, size of the mouth, etc., but I do not feel inclined to regard them as representing a distinct species on the basis of the material to hand. Parr (1937, 'Bull. Bingham Ocean. Coll.' III, Art. 7, p. 20) has shown that Vaillant's species cannot be maintained as distinct from *X. copei*.

Alepocephalus bicolor, Alcock.

Alepocephalus bicolor, Alcock, 1891, Ann. Mag. Nat. Hist. (6) VIII, p. 133 ; 1892, Illust. Zool. " Investigator ", pl. iv, fig. 2 ; 1899, Cat. Indian Deep-sea Fish. p. 169 ; Brauer, 1906, " Valdivia " Tiefsee-Fische, p. 19 ; Weber and Beaufort, 1913, Fish. Indo-Austral. Arch. II, p. 13.

Occurrence :

St. 193, Gulf of Aden, AT, 1061–1080 m. ; 2 (265, 290 mm.).

Distribution.—Gulf of Aden, Arabian Sea, Bay of Bengal, Indo-Australian Archipelago.

Bajacalifornia burragei, Townsend & Nichols.

Bajacalifornia burragei, Townsend & Nichols, 1925, Bull. Amer. Mus. Nat. Hist. LII (1), p. 8, fig. 3.

Occurrence :

St. 193, Gulf of Aden, AT, 1061–1080 m. ; 1 (170 mm.).

Distribution.—Gulf of Aden, off Lower California.

Description.—Depth of body more than 6 in the length, length of head about $3\frac{1}{2}$. Snout nearly $1\frac{1}{2}$ times as long as eye, diameter of which is nearly 5 in length of head (including lower jaw) and about $1\frac{1}{2}$ times the interorbital width. Maxillary extending to a little beyond middle of eye. Sixteen gill-rakers on lower part of anterior arch. About 57 scales in a longitudinal series. Dorsal 17 (?). Anal 14 (?) ; origin a little behind middle of dorsal, $2\frac{1}{2}$ times as distant from tip of snout as from base of caudal. Pectoral with about 16 rays ; pelvics equidistant from anterior part of eye and base of caudal. Pyloric cæca long and narrow, about 18 in number, in a single series anteriorly, in two series posteriorly. Uniformly black.

Remarks.—Allowing for the difference in the size of the fishes, the specimen described above agrees closely with the holotype (Amer. Mus. Nat. Hist. No. 8343) as described and figured by Townsend and Nichols. This was 120 mm. in length to the base of the caudal fin, and was captured off Todos Santos Bay, Southern California, at a depth of 1106 metres. The pyloric cæca have a very different form to those described by Parr (1937, 'Bull. Bingham Ocean. Coll.' III, Art. 7, p. 25) in *B. drakei* (Beebe), which are short and bulbous, with pointed tips. The species described by Weber as *Bathytroctes calcaratus*, from the Straits of Macassar and the Ceram Sea, appears to belong to this genus, but may be readily distinguished from *B. burragei* by the smaller eye.

Family Argentinidæ.

Genus *Nansenia*, Jordan & Evermann.

Nansenia, Jordan & Evermann, 1896, Bull. U.S. Nat. Mus. XLVII (1), p. 528 ; Schmidt, 1918, Rep. Danish Ocean. Exped. 1908–10 Medit. II, A. 5, p. 10.

Bathymacrops, Gilchrist, 1922, Rep. Fish. Mar. Biol. Surv. S. Afr. II (1921), Spec. Rep. III, p. 53 ; Barnard, 1925, Ann. S. Afr. Mus. XXI, p. 129.

Euproserpa, Fowler, 1933, Proc. Acad. N.S. Philad. LXXXV, p. 256.

I place this genus provisionally in the family Argentinidæ, pending an examination of its osteology. It seems to be more nearly related to *Bathylagus*, Günther, than to *Microstoma*, Cuvier.

Nansenia grœnlandica (Reinhardt).

Microstomus grœnlandicus, Reinhardt, 1839, Overs. K. Danske Vid. Selsk. Forhandl., 1839, p. 8 ; 1841, K. Danske Vid. Selsk. Naturv. Math. Afhandl. VIII, p. lxxiv ; Günther, 1866, Cat. Fish. VI, p. 205.

Nansenia grœnlandica, Jordan & Evermann, 1896, *t.c.*, p. 528 ; Schmidt, 1918, *t.c.*, p. 12, figs. 9–12.

Bathymacrops macrolepis, Gilchrist, 1922, *t.c.*, p. 53, pl. ix, fig. 2 ; Barnard, 1925, *t.c.*, p. 129, pl. vii, fig. 3.

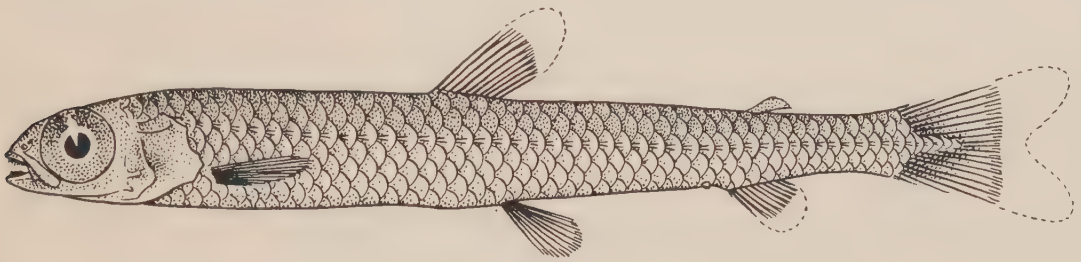
Occurrence :

St. 115, Zanzibar area, OT, 640–658 m. ; 1 (175 mm.).

St. 145, Maldive area, AT, 494 m. ; 1 (180 mm.).

Distribution.—North Atlantic, South Africa, near Zanzibar, Maldives.

Description.—Depth of body $7\frac{1}{2}$ to nearly 8 in the length, length of head about $4\frac{1}{2}$. Snout less than $\frac{1}{2}$ as long as eye, diameter of which is $2\frac{1}{2}$ in length of head and 3 times the interorbital width. No teeth in the upper jaw; a single series of closely set, compressed, conical teeth in the lower jaw; vomer with a row of slender, curved teeth with sharply-pointed tips. 20 to 22 gill-rakers on lower part of anterior arch. About 50 scales in a longitudinal series. Dorsal 10; origin nearer to end of snout than to base of caudal. Anal 9–10; origin much nearer to base of caudal than to insertion of pelvic, more than 4 times as distant from end of snout as from base of caudal; length of base 4 or nearly 4 in that of head. Pectoral with 14-rays. Pelvics with 11 or 12 rays, inserted below or just behind level of last dorsal ray.



Text-fig. 4.—*Nansenia grœnlandica*. St. 115. × $\frac{3}{4}$.

Remarks.—This species was not previously represented in the collection of the British Museum, and is known to me only from the excellent description given by Schmidt, who had access to the type, 76 mm. in length to the base of the caudal, from Fiskenæsset, West Greenland. All Schmidt's specimens were smaller than the type, but, making allowances for the discrepancy in the sizes of the fish, I am unable to detect any marked differences between those from the Atlantic and those from the Indian Ocean. Tanaka (1911, 'Fig. Descr. Fish. Japan', I, p. 15, pl. iii, fig. 13) records this species from Japan, but Jordan and Thompson (1914, 'Mem. Carnegie Mus.' VI, p. 210, pl. xxiv, fig. 2) regard the Japanese form as distinct, giving it the name *Nansenia ardesiaca*.* This species is very closely related to *N. grœnlandica*, and may eventually prove to be identical with it, but the pelvic fins seem to be inserted a little more posteriorly and there are fewer rays in the pectorals. *Nansenia oblita* (Facciola), from the Mediterranean and the adjacent parts of the Atlantic, is quite distinct, and has been fully described by Schmidt in the paper already quoted. *N. schmitti* (Fowler), from near Borneo and the Philippines, is another species.

Family Gonostomatidæ.

Gonostoma elongatum, Günther.

Occurrence:

St. 133, Arabian Sea, MT, 3385 m.; 1 (220 mm.).

St. 168, Arabian Sea, MT, 2937–3182 m.; 1 (190 mm.).

Distribution.—Atlantic, Indo-Pacific.

* Schmidt (1918, *t.c.*, p. 15), who was unable to consult Jordan and Thompson's paper published in 1914, proposed the name *Nansenia tanakai* for this species.

Cyclothone signata, Garman.

Occurrence :

St. 172, Arabian Sea, N 100, 400–0 m. ; 20 (18–30 mm.). N 200, 2091–0 m. ; 6 (fragmentary).

St. 186, Gulf of Aden, N 100, 600–0 m. ; 24 (17–25 mm.). N 200, 952–0 m. ; 30 (20–27 mm.).

Distribution.—Atlantic, Indian Ocean, Gulf of Panama.

Remarks.—Jesperson and Tåning (1926, 'Rep. Danish Ocean. Exped. 1908–10 Medit.' II, A. 12, p. 12) have indicated the principal differences between this species and their *Cyclothone braueri*.

Cyclothone pallida, Brauer.

Occurrence :

St. 18, Gulf of Aden, N 200, 900–0 m. ; 2 (35, 40 mm.).

St. 61A–B, Arabian Sea, N 200, 2000–0 m. ; 1 (37 mm.).

St. 76, Gulf of Oman, N 100, 1500 m. ; 3 (27–45 mm.).

St. 95, Arabian Sea, N 200, 430–984 m. ; 2 (25, 40 mm.).

St. 131D, Arabian Sea, N 100, 1500–0 m. ; 3 (26–38 mm.).

St. 156, Maldive area, AT, ? m. ; 4 (30–47 mm.).

St. 158, Maldive area, AT, 786–1170 m. ; 1 (39 mm.).

St. 168, Arabian Sea, MT, 2937–3182 m. ; 1 (40 mm.).

St. 172, Arabian Sea, N 100, 850–0 m. ; 2 (38, 39 mm.).

St. 186, Gulf of Aden, N 200, 952–0 m. ; 5 (25–40 mm.).

St. 193, Gulf of Aden, AT, 1061–1080 m. ; 1 (43 mm.).

Distribution.—Atlantic, Indian Ocean.

Cyclothone acclinidens, Garman.

Occurrence :

St. 61A–B, Arabian Sea, N 100, 1000–0 m. ; 9 (19–28 mm.). N 100, 1500–0 m. ; 7 (18–27 mm.). N 200, 2000–0 m. ; 14 (23–33 mm.).

St. 61C–D, Arabian Sea, N 100, 1500–0 m. ; 14 (22–32 mm.). N 200, 2000–0 m. ; 40 (20–33 mm.).

St. 76, Gulf of Oman, N 100, 1500 m. ; 18 (17–28 mm.). N 200, 2500 m. ; 8 (20–34 mm.).

St. 94, Arabian Sea, N 200, 984–1045 m. ; 1 (32 mm.).

St. 95, Arabian Sea, N 200, 430–984 m. ; 17 (20–35 mm.).

St. 131D, Arabian Sea, N 100, 1500–0 m. ; 4 (20–35 mm.). N 200, 2500–0 m. ; 4 (24–37 mm.).

St. 172, Arabian Sea, N 100, 850–0 m. ; 10 (12–27 mm.).

St. 186, Gulf of Aden, N 200, 952–0 m. ; 34 (20–34 mm.).

Distribution.—Atlantic, Indo-Pacific.

Yarrella corythæola (Alcock).

Occurrence :

St. 35, Gulf of Aden, OT, 457–549 m. ; 3 (115–135 mm.).

St. 109, Zanzibar area, AT, 640 m. ; 3 (80–153 mm.).

St. 115, Zanzibar area, OT, 640–658 m. ; 4 (185–205 mm.).

St. 145, Maldive area, AT, 494 m. ; 4 (95–115 mm.).

Distribution.—Natal coast, near Zanzibar, Gulf of Aden, near Maldives, Andaman Sea, Southern Australia.

Description.—Depth of body about 6 in the length, length of head 4 to $4\frac{2}{5}$. Diameter of eye equal to or a little greater than interorbital width and $4\frac{3}{4}$ to 5 in length of head. 10 to 12 gill-rakers on lower part of anterior arch. Dorsal 11–12 ; origin about equidistant from end of snout and base of caudal. Anal 26–30 ; origin below or immediately behind last rays of dorsal. Pectoral with 10 or 11 rays. Pelvic with 7 rays ; origin equidistant from tip of lower jaw and last rays of anal. Lower series of photophores consisting of 9 in front of pectoral, 11 from pectoral to pelvic, 8 from pelvic to origin of anal, and 23 to 25 from anal to base of caudal ; there are 16 to 18 photophores in the upper series.

Remarks.—Matsubara (1938, 'J. Imp. Fish. Inst. Tokyo', XXXIII, p. 44) has suggested that this form should be regarded merely as a subspecies of *Y. blackfordi*, Goode & Bean.

Vinciguerria nimbaria (Jordan & Williams).

For synonymy see Horsburgh, 1935, Proc. Calif. Acad. Sci. (4) XXI, p. 230.

Occurrence :

St. 61A–B, Arabian Sea, N 100, 1500–0 m. ; 39 (17–39 mm.). N 200, 2000–0 m. ; 24 (26–38 mm.).

St. 61C–D, Arabian Sea, N 100, 1000–0 m. ; 9 (18–36 mm.). N 100, 1500–0 m. ; 5 (18–27 mm.).

St. 76, Gulf of Oman, N 100, 600 m. ; 1 (32 mm.).

St. 87, Arabian Sea, AT, 549–640 m. ; 82 (25–46 mm.).

St. 172, Arabian Sea, N 100, 400–0 m. ; 1 (17 mm.).

Distribution.—Atlantic, Indo-Pacific.

Remarks.—Dr. Rolf L. Bolin, of the Hopkins Marine Station, California, has been kind enough to compare two or three of the above-mentioned specimens from the Arabian Sea with the types of *V. nimbaria* and also with five specimens of *V. sanzoi* from the North Atlantic, sent to Dr. Horsburgh by Dr. A. V. Tåning. The types of *V. nimbaria* are 51·2 and 50·8 mm. in standard length respectively, being much larger than any of the other specimens. Dr. Bolin notes that the pectoral and anal fins are relatively further forward in the types of *V. nimbaria*, but this difference in position may well be a matter of age. He adds : " It is my opinion that the types of *V. nimbaria*, Taning's Atlantic specimens of '*V. sanzoi*' and your Arabian Sea material all belong to one and the same species."

Diplophos tænia, Günther.

Occurrence :

St. 96, Arabian Sea, N 200, 400–645 m. ; 2 (39, 48 mm.).

Distribution.—Atlantic, Indian Ocean, Pacific (?).

Ichthyococcus ovatus (Cocco).

Occurrence :

St. 172, Arabian Sea, N 100, 400–0 m. ; 1 (13 mm.).

Distribution.—Mediterranean, Eastern Atlantic, Indian Ocean.

Remarks.—This specimen is in poor condition, but appears to belong to this species.

Family Sternoptychiidæ.

Argyropelecus affinis, Garman.

Occurrence :

St. 96, Arabian Sea, N 200, 400–645 m. ; 1 (47 mm.).

St. 155, Maldive area, MT, 2249 m. ; 1 (26 mm.).

St. 162, Maldive area, AT, 1829–2051 m. ; 1 (35 mm.).

St. 171, Arabian Sea, AT, 3840–3872 m. ; 2 (46, 62 mm.).

St. 193, Gulf of Aden, AT, 1061–1080 m. ; 1 (58 mm.).

Distribution.—Atlantic, Indian Ocean.

Argyropelecus sladeni, Regan.

Occurrence :

St. 95, Arabian Sea, N 200, 430–984 m. ; 1 (25 mm.).

St. 120, Zanzibar area, AT, 2926 m. ; 1 (45 mm.).

St. 131, Arabian Sea, N 200, 600–0 m. ; 1 (47 mm.).

Distribution.—North and South Atlantic, Antarctic, Indo-Pacific.

Sternoptyx diaphana, Hermann.

Occurrence :

St. 95, Arabian Sea, N 200, 430–984 m. ; 1 (15 mm.).

St. 118, Zanzibar area, AT, 1789 m. ; 1 (25 mm.).

St. 120, Zanzibar area, AT, 2926 m. ; 1 (37 mm.).

St. 121, Zanzibar area, AT, ? m. ; 1 (17 mm.).

St. 156, Maldive area, AT, ? m. ; 3 (19–34 mm.).

St. 158, Maldive area, AT, 786–1170 m. ; 2 (17, 18 mm.).

St. 170, Arabian Sea, AT, 3676 m. ; 1 (24 mm.).

Distribution.—Atlantic, Indo-Pacific.

Polyipnus nuttingi, Gilbert.

Polyipnus nuttingi, Gilbert, 1905, Bull. U.S. Fish. Comm. XXIII (1903), p. 609, pl. lxxiii ; Schultz, 1938, Proc. U.S. Nat. Mus. LXXXVI, p. 145.

Occurrence :

St. 115, Zanzibar area, OT, 640–658 m. ; 4 (50–60 mm.).

Distribution.—Near Zanzibar, Marcus Islands, Hawaiian Islands.

Remarks.—This species is closely related to *P. spinosus*, Günther, which has a wide range in the Atlantic and Indo-Pacific, but the differences have been clearly demonstrated by Schultz.

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Family Astronesthidæ.

Astronesthes martensii, Klunzinger.

Astronesthes martensii, Klunzinger, 1871, Verh. zool.-bot. Ges. Wien, XXI, p. 154 ; Lütken, 1892, Danske Vid. Selsk. Skr. (6) VII, p. 276, pl. iii, figs. 6, 7 ; Regan & Trewavas, 1929, Ocean. Rep. Danish " Dana " Exped. 1920–22, V, p. 17, fig. 7.

Occurrence :

St. 172, Arabian Sea, N 200, 2091–0 m. ; 1 (24 mm.).

Distribution.—Red Sea, Arabian Sea.

Remarks.—This young specimen appears to belong to this species, previously recorded only from the Red Sea. One of the specimens collected by Klunzinger, 115 mm. in total length, is in the British Museum (Natural History).

Diplolychnus mononema, Regan & Trewavas.

Diplolychnus mononema, Regan & Trewavas, 1929, *t.c.*, p. 28, pl. v, fig. 2, text-fig. 19.

Occurrence :

St. 115, Zanzibar area, OT, 640–658 m. ; 1 (150 mm.).

Distribution.—Atlantic, Indian Ocean.

Remarks.—This specimen is in poor condition, and it is impossible to count the photophores. The form of the barbel and of the postocular luminous organ is very similar to that of *D. mononema*.

Family Chauliodontidæ.

Chauliodus sloanei, Schneider.

For synonymy and description see Regan & Trewavas, 1929, Ocean. Rep. Danish " Dana " Exped. 1920–22, V, p. 32, fig. 24.

Occurrence :

St. 121, Zanzibar area, AT, ? m. ; 1 (80 mm.).

St. 145, Maldive area, AT, 494 m. ; 1 (180 mm.).

Distribution.—Mediterranean, Atlantic, Indo-Pacific.

Chauliodus pammelas, Alcock.

Chauliodus pammelas, Alcock, 1892, Ann. Mag. Nat. Hist. (6) X, p. 355 ; 1899, Cat. Indian Deep-sea Fish p. 145 ; 1900, Illust. Zool. " Investigator ", pl. xxx, fig. 4 ; Brauer, 1906, " Valdivia " Tiefsee-Fische p. 42.

Occurrence :

St. 33, Gulf of Aden, AT, 1295 m. ; 1 (140 mm.).

St. 34, Gulf of Aden, AT, 1022 m. ; 1 (185 mm.).

St. 76, Gulf of Oman, N 200, 2500 m. ; 1 (145 mm.).

St. 95, Arabian Sea, N 200, 430–984 m. ; 4 (83–170 mm.).

St. 96, Arabian Sea, N 200, 400–645 m. ; 1 (27 mm.).

St. 145, Maldive area, AT, 494 m. ; 1 (170 mm.).

St. 172, Arabian Sea, N 100, 850–0 m. ; 1 (55 mm.). N 200, 2091–0 m. ; 1 (205 mm.).

St. 186, Gulf of Aden, N 200, 952–0 m. ; 2 (90, 120 mm.).

Distribution.—Indian Ocean.

Description.—Depth of head 7 to 8 in the length to base of caudal, equal to or slightly greater than length of lower jaw. Diameter of eye $3\frac{1}{4}$ to $4\frac{1}{4}$ in length of lower jaw. A series of 4 to 8 minute, oblique denticles usually clearly distinguishable by means of a lens at posterior end of lower jaw. 16 to 19 branchiostegal rays. Barbel slender and tapering in adult and young, relatively longer in the latter. Photophores of the ventral series I.–P. 10 or 11 ; P.–V. 16–19 ; V.–A. 20–22, usually 21 ; of the lateral series, O.–V. 17–19, usually 18 ; V.–A. 21 or 22 ; of the single caudal series, 9–11, usually 11. Total number of photophores in lateral and caudal series 49–51. Unpigmented photophores minute, almost invisible to the naked eye, not forming distinct paired groups on the ventral surface. Dorsal 6 ; first ray above 5th or 6th photophore of the lateral series. Anal 11–12. Pectoral 12–14. Pelvic 7. Uniformly blackish.

Remarks.—As pointed out by Regan and Trewavas (1929, *t.c.*, p. 31), this species is closely related to *C. barbatus*, Garman, but differs chiefly in the form of the head, the presence of oblique denticles at the posterior end of the lower jaw, the slender tapering barbel, the more anterior insertion of the dorsal fin, and the irregular arrangement of the unpigmented photophores on the ventral surface. The type of *Chauliodus pammelas* (Ind. Mus. Reg. No. 13183), about 255 mm. in total length, was captured in the Arabian Sea in the neighbourhood of Minnikoy, at a depth of 2570 metres. This species was previously unrepresented in the British Museum collection.

Family Stomiatidæ.

Stomias affinis, Günther.

For synonymy and description see Ege, 1934, " Dana " Report, No. 5, p. 5, figs. 1, 2.

Occurrence :

St. 168, Arabian Sea, MT, 2937–3182 m. ; 1 (78 mm.).

St. 208, Red Sea, TD 4, 732–805 m. ; 1 (82 mm.).

Distribution.—Atlantic, Indo-Pacific.

Stomias nebulosus, Alcock.

For synonymy and description see Ege, 1934, *t.c.*, p. 39, figs. 11, 12.

Occurrence :

St. 115, Zanzibar area, OT, 640–658 m. ; 1 (93 mm.).

Distribution.—Tropical Indo-Pacific.

Remarks.—This species is new to the British Museum collection.

Idiacanthus fasciola, Peters.

Occurrence :

St. 121, Zanzibar area, AT, ? m. ; 2 (100, 135 mm.).

Distribution.—Atlantic, Indian Ocean, Western Pacific, ? Antarctic Ocean.

Family Malacosteidæ.

Malacosteus niger, Ayres.

Occurrence :

St. 131D, Arabian Sea, N 200, 2500–0 m. ; 1 (110 mm.).

St. 193, Gulf of Aden, AT, 1061–1080 m. ; 1 (80 mm.).

Distribution.—Atlantic, Indian Ocean.

Family Synodontidæ.

Synodus variegatus (Lacepède).

Occurrence :

St. 27, Gulf of Aden, OT, 37–91 m. ; 1 (70 mm.).

Distribution.—East Africa and the Red Sea, through the Indian Ocean and Archipelago, to the Pacific.

Synodus indicus (Day).

Occurrence :

St. 27, Gulf of Aden, OT, 37–91 m. ; 1 (120 mm.).

Distribution.—South-east Africa, Gulf of Aden, Madras.

Saurida tumbil (Bloch).

Occurrence :

St. 37, Gulf of Aden, OT, 18–22 m. ; 1 (135 mm.).

Distribution.—East Africa and the Red Sea, through the Indian Ocean and Archipelago, to north-eastern Australia and to China.

Saurida undosquamis (Richardson).

Occurrence :

St. A, Red Sea, OT, 65–68 m. ; 3 (230–240 mm.).

St. 72, Gulf of Oman, AT, 73 m. ; 1 (144 mm.).

St. 106, Zanzibar area, AT, 183–194 m. ; 10 (105–182 mm.).

St. 194, Gulf of Aden, AT, 220 m. ; 1 (255 mm.).

Distribution.—East Africa and the Red Sea, through the Indian Ocean and Archipelago, to Australia, Japan and the Pacific.

Saurida longimanus, sp. n.

Occurrence :

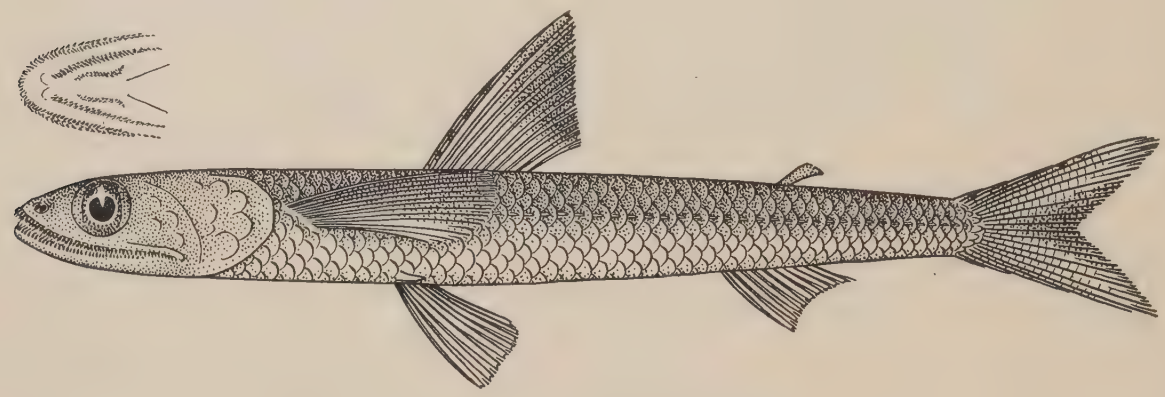
St. 71, Gulf of Oman, OT, 106 m. ; 1 (75 mm.).

St. 75, Gulf of Oman, OT, 201 m. ; 5 (142–200 mm.). Holotype, 162 mm.

Distribution.—Gulf of Oman.

Description.—Depth of body about 8 in the length, length of head $3\frac{1}{4}$ to $3\frac{2}{3}$. Snout rounded, as long as or slightly longer than eye, diameter of which is 4 (young) to nearly

$4\frac{3}{4}$ in length of head and about equal to interorbital width. Adipose eyelids of moderate width. Outer bands of palatine teeth each with only 2 rows anteriorly, where the two bands are widely separated ; some of the anterior teeth enlarged ; inner bands of palatine teeth narrow, each with 2 or 3 rows ; vomer toothless. 45 to 49 scales in the lateral line. Dorsal 11 or 12 ; longest ray nearly 4 times as long as last ray and about $\frac{3}{4}$ length of head. Anal 10 or 11 ; origin $1\frac{3}{4}$ times to twice as far from head as from base of caudal. Pectoral



Text-fig. 5.—*Saurida longimanus*. Holotype. × 1.

with 14 rays, extending well beyond base of pelvic, length $\frac{4}{5}$ to $\frac{7}{8}$ that of head. Brownish above, silvery white below ; distal parts of dorsal, caudal and pectorals blackish ; sometimes traces of dark marks along upper edge of caudal.

Remarks.—This species is related to *S. undosquamis*, but may be readily recognized by the longer pectoral fin, the larger head, and the narrower inner bands of palatine teeth. If specimens of similar size are compared, it is seen that *S. longimanus* has a somewhat longer snout and a slightly larger eye than *S. undosquamis*.

Family Sudidæ.

Chlorophthalmus agassizi, Bonaparte.

For synonymy see Parr, 1928, Bull. Bingham Ocean. Coll. III, Art. 3, p. 19.

Occurrence :

St. 105, Zanzibar area, AT, 238–293 m. ; 21 (70–110 mm.).

Distribution.—Mediterranean, Atlantic, Indo-Pacific.

Description.—Depth of body $5\frac{1}{2}$ to 7 in the length, length of head 3 to $3\frac{1}{5}$. Snout $\frac{3}{5}$ to $\frac{3}{4}$ diameter of eye, which is $2\frac{1}{2}$ to $2\frac{3}{4}$ in length of head and 3 to 4 times the interorbital width. Maxillary extending to below anterior part of eye ; lower jaw terminating in a strongly projecting, transverse horizontal plate, the anterior margin of which is usually more or less denticulated. About 20 gill-rakers on lower part of anterior arch. 50 to 58 scales in the lateral line. Dorsal 10 or 11 ; origin slightly in advance of insertion of pelvics and a little nearer to the tip of the snout than to the adipose fin. Anal 9–11 ; origin a little in advance of level of anterior margin of adipose fin, about 3 times as distant from anterior edge of eye as from base of caudal. Pectoral with 15 or 16 rays, $1\frac{1}{8}$ to $1\frac{1}{4}$ in length

of head. Pelvic with 9 rays, its insertion equidistant from tip of snout and origin of anal fin or a little nearer the latter. Silvery grey, with large dusky or blackish spots, often forming irregular oblique cross-bars, which are more prominent in young specimens and tend to disappear altogether in the adults.

The specimens from near Zanzibar agree very well with Alcock's description of *C. corniger*, from the Bay of Bengal, but I am in agreement with Parr in regarding this species, as well as Günther's *C. productus*, from the Pacific, as probably identical with *C. agassizi*, originally described from the Mediterranean. To the synonymy of *C. agassizi*, which thus has an almost world-wide range, I would add *C. proridens*, Gilbert & Cramer, from deep water off the Hawaiian Islands. The denticulations on the margin of the projecting part of the lower jaw exhibit considerable variation: they generally form two groups on either side of the symphysis, but these groups may be united to form a continuous row along the anterior edge. In addition to the specimens obtained by the "Mabahiss", the above description includes the types of *C. productus*, as well as several examples of *C. agassizi* from the Mediterranean and Atlantic.

Chlorophthalmus bicornis, sp. n.

Occurrence:

St. 177, Gulf of Aden, AT, 274–366 m.; 1 (93 mm.). Holotype.

Distribution.—Gulf of Aden.

Description.—Closely related to *C. agassizi*, but depth of body $4\frac{2}{3}$ in the length, length of head $2\frac{2}{3}$. Snout nearly $\frac{3}{4}$ diameter of eye, which is 3 in length of head and $3\frac{1}{2}$ times the interorbital width. Lower jaw terminating in a strongly projecting, transverse horizontal plate, the corners of which are produced to form strong tooth-like processes:

Text-fig. 6.—*Chlorophthalmus bicornis*. Holotype. × 1.

no other denticulations at edge of lower jaw. About 25 gill-rakers on lower part of anterior arch. 48 scales in lateral line. Dorsal 11; origin slightly nearer to adipose fin than to tip of snout. Anal 10; origin well in advance of level of anterior margin of adipose fin, twice as distant from anterior edge of eye as from base of caudal. Length of pectoral about $1\frac{1}{2}$ in that of head. Insertion of pelvic much nearer to origin of anal than to tip of snout. Silvery grey, with numerous minute black spots and with traces of broad, darker cross-bars; the bases and inner parts of the pelvic fins black.

Genus *Bathymicrops*, Koefoed.

Bathymicrops, Koefoed, 1926, Rep. Sci. Res. "Michael Sars" N. Atlantic Deep-sea Exped. 1910, IV (1), p. 64.

Body rather elongate, moderately compressed, covered with cycloid scales of moderate size; lateral line nearly straight. Head a little depressed, completely scaled; snout not spatulate; eyes absent, or vestigial and covered by scales; nostrils close together. Mouth wide, the suspensorium directed obliquely backwards; lower jaw strongly projecting; maxillary slender, somewhat dilated posteriorly, closely adherent to the equally slender præmaxillary; a single supramaxillary; jaws with narrow bands of minute granular teeth, which are also present on the palatines and pterygoids and in two patches on the vomer. Gill-openings very wide; gill-membranes free; about 14 branchiostegals; no pseudobranchiæ; gill-rakers reduced to a few short dentigerous knobs. Dorsal short, situated in front of the middle of the length; no adipose fin. Anal short, situated nearer to base of caudal than to pelvics. Pectoral lateral in position, well developed. Pelvics 8-rayed, rather wide apart, inserted well behind the pectorals, but in advance of the dorsal; pelvic bones with broad laminar posterior processes, united medianly throughout their length. Vent just behind the bases of the pelvic fins.

I have placed this genus in the family Sudidæ, as it would seem to be most nearly related to *Bathysauropsis* and *Ipnops*, but the osteology has been examined in so very few genera of this family that a satisfactory arrangement is still difficult. In some respects *Bathymicrops* resembles the members of the family Synodontidæ, but differs from them especially in the anterior position of the vent and in the presence of a supramaxillary.

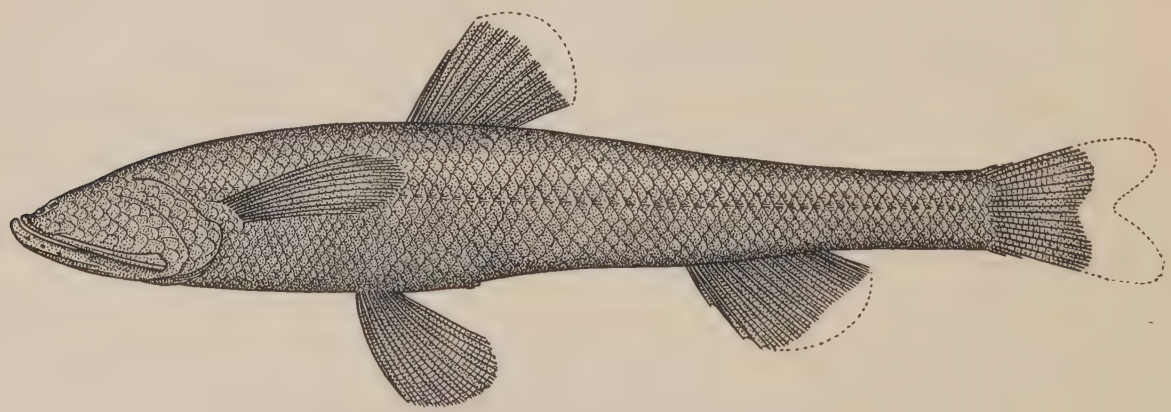
Bathymicrops sewelli, sp. n.

Occurrence:

St. 171, Arabian Sea, AT, 3840–3872 m.; 1 (350 mm.). Holotype.

Distribution.—Arabian Sea.

Description.—Depth of body about 6 in the length, length of head $4\frac{1}{2}$. Length of upper jaw about $\frac{3}{4}$ that of head. About 12 rudimentary gill-rakers on lower part of



Text-fig. 7.—*Bathymicrops sewelli*. Holotype. × $\frac{2}{5}$.

anterior arch. About 60 scales in the lateral line. Dorsal 11; origin $1\frac{1}{2}$ times as distant from base of caudal as from tip of snout. Anal 16; origin about equidistant from root of pelvic and base of caudal. Pectoral 11-rayed. Pelvics inserted nearly twice as far

from base of caudal as from tip of lower jaw ; inner ray of each fin slightly in advance of level of origin of dorsal. Caudal peduncle twice as long as deep, its length about 6 in that of fish (without caudal fin). Uniformly brownish.

Remarks.—This species may be readily distinguished from *B. regis*, Koefoed, from the North Atlantic, by the complete absence of the eyes, the deeper body, longer head, shorter and deeper caudal peduncle, greater number of rays in the anal and pectoral fins, more posterior insertion of pelvic fins, etc. The unique holotype of *B. regis* is only 110 mm. in length, and was taken by the " Michael Sars " at St. 48 (28° 54′ N., 24° 14′ W.), at a depth of about 5000 metres. I have much pleasure in naming this very interesting species in honour of Lt.-Col. R. B. Seymour Sewell, C.I.E., F.R.S., the leader of the " John Murray " Expedition.

Bathypterois atricolor, Alcock.

Occurrence :

St. 34, Gulf of Aden, AT, 1022 m. ; 1 (90 mm.).

Distribution.—Atlantic, Indian and Pacific Oceans.

Ipnops murrayi, Günther.

Ipnops murrayi, Günther, 1878, Ann. Mag. Nat. Hist. (5) II, p. 187 ; 1887, Deep-sea Fish. " Challenger ", p. 189, pl. xlix, fig. B ; Parr, 1928, Bull. Bingham Ocean. Coll. III, Art. 3, p. 23.

? *Ipnops agassizii*, Garman, 1899, Mem. Mus. Comp. Zoöl. XXIV, p. 259, pl. H, figs. 2, 2*a* ; Parr, 1928, *t.c.*, p. 24.

Occurrence :

St. 118, Zanzibar area, AT, 1789 m. ; 3 (83–132 mm.).

Distribution.—Atlantic, Indian and Pacific Oceans.

Remarks.—*Ipnops agassizii* was said to differ from *I. murrayi* mainly in the greater length in the caudal region, the longer anal fin, the smaller number of branchiostegal rays, the greater number of scales in the lateral line, and the more posterior position of the pelvic fins, which are farther from the dorsal fin. In three of the types of *I. murrayi* I count 10, ? , 12 branchiostegal rays ; 13, 13, 17 rays in the anal fin ; and 54, 55, 52 (?) scales in the lateral line. In the specimens from near Zanzibar the number of branchiostegal rays appears to be 12, 12, 12 (?) ; the number of rays in the anal fin is 17, 17, 19 ; and the number of scales in the lateral line is 54, 58, 58. The position of the pelvic fins in relation to the dorsal exhibits some variation in the specimens examined, but I am unable to correlate this with differences in the numbers of scales or anal rays. It seems probable that *I. agassizii* will prove to be identical with *I. murrayi*, but I have hesitated to unite them on account of the small amount of material available.

Family Myctophidæ.

Genus *Scopelengys*, Alcock.

Scopelengys, Alcock, 1890, Ann. Mag. Nat. Hist. (6) VI, p. 302.

Scopelengys is a very generalized member of this family, and closely related to *Neoscopelus*. The eye is small, the pseudobranchiæ rudimentary, the air-bladder is wanting and there are no photophores.

Scopelengys tristis, Alcock.

Scopelengys tristis, Alcock, 1890, *t.c.* p. 303 ; 1892, Illust. Zool. " Investigator ", pl. vii, fig. 7 ; 1899, Cat. Indian Deep-sea Fish. p. 166 ; Parr, 1928, Bull. Bingham Ocean. Coll. III, Art. 3, p. 48.
Scopelengys dispar, Garman, 1899, Mem. Mus. Comp. Zoöl. XXIV, p. 254, pl. liv, figs. 2–2*d*.

Occurrence :

St. 95, Arabian Sea, N 200, 430–984 m. ; 1 (190 mm.).

Distribution.—Arabian Sea, Pacific coast of Central America.

Remarks.—This specimen is in poor condition, so that I am unable to add anything to the descriptions of Alcock and Garman, which clearly refer to the same species. This fish was previously unrepresented in the British Museum collection.

Neoscopelus macrolepidotus, Johnson.

For synonymy see Parr, 1928, *t.c.*, p. 48.

Occurrence :

St. 108, Zanzibar area, AT, 786 m. ; 2 (185, 190 mm.).

St. 115, Zanzibar area, OT, 640–658 m. ; 16 (90–160 mm.).

St. 145, Maldive area, AT, 494 m. ; 15 (30–180 mm.).

Distribution.—All temperate and tropical seas.

Myctophum pterotum (Alcock).

See Parr, 1928, *t.c.*, p. 60.

Occurrence :

St. 61A–B, Arabian Sea, N 100, 1500–0 m. ; 1 (24 mm.). N 200, 2000–0 m. ; 9 (27–38 mm.).

St. 70, Gulf of Oman, OT, 196 m. ; 3 (34–45 mm.).

St. 76, Gulf of Oman, N 100, 600 m. ; 1 (27 mm.). N 200, 2500 m. ; 2 (25, 27 mm.).

St. 87, Arabian Sea, AT, 549–640 m. ; 2 (45, 48 mm.).

Distribution.—Indian and Pacific Oceans ; Atlantic (?).

Remarks.—This species has been so frequently confused with *M. fibulatum*, Gilbert & Cramer, that it is difficult to ascertain the range of its distribution.

Myctophum fibulatum, Gilbert & Cramer.

See Parr, 1928, *t.c.*, pp. 61, 67, fig. 7.

Occurrence :

St. 61A–B, Arabian Sea, N 200, 2000–0 m. ; 1 (28 mm.).

Distribution.—Atlantic, Indian and Pacific Oceans.

Myctophum laternatum, Garman.

See Parr, 1928, *t.c.*, pp. 61, 67.

Occurrence :

St. 95, Arabian Sea, N 200, 430–984 m. ; 1 (27 mm.).

St. 172, Arabian Sea, N 100, 400–0 m. ; 1 (16 mm.). N 100, 850–0 m. ; 9 (16–20 mm.). N 200, 2091–0 m. ; 1 (23 mm.).

Distribution.—Atlantic, Indian and Pacific Oceans.

Myctophum reinhardti, Lütken.

See Parr, 1928, *t.c.*, p. 66.

Occurrence :

St. 95, Arabian Sea, N 200, 430–984 m. ; 1 (25 mm.).

Distribution.—Atlantic, Indian and Pacific Oceans.

Remarks.—This species is new to the British Museum collection.

Lampanyctus macropterus, Brauer.

See Parr, 1928, *t.c.*, pp. 88, 110, fig. 20.

Occurrence :

St. 95, Arabian Sea, N 200, 430–984 m. ; 4 (21–32 mm.).

St. 172, Arabian Sea, N 200, 2091–0 m. ; 3 (20–55 mm.).

St. 186, Gulf of Aden, N 200, 952–0 m. ; 32 (16–68 mm.).

Distribution.—Atlantic, Indian and Pacific Oceans.

Remarks.—These specimens are all in poor condition, but appear to be referable to this species.

Lampanyctus alatus, Good & Bean.

See Parr, 1929, Proc. U.S. Nat. Mus. LXXVI, Art. 10, p. 25, fig. 12.

Occurrence :

St. 121, Zanzibar area, AT, ? m. ; 1 (58 mm.).

St. 131A, Arabian Sea, N 200, 600–0 m. ; 2 (24, 45 mm.).

St. 131D, Arabian Sea, N 100, 1500–0 m. ; 3 (12–20 mm.).

Distribution.—Atlantic and Indian Oceans.

Lampanyctus sp.

The following specimens are all in very poor condition and cannot be specifically identified :

Occurrence :

St. 25, Gulf of Aden, AT, 620 m. ; 1 (68 mm.).

St. 135, Arabian Sea, MT, 2727 m. ; 1 (90 mm.).

St. 143, Maldive area, AT, 797 m. ; 1 (32 mm.).

St. 145, Maldive area, N 100, 500–0 m. ; 1 (20 mm.).

St. 171, Arabian Sea, AT, 3840–3872 m. ; 1 (44 mm.).

Diaphus luetkeni, Brauer.

See Parr, 1928, Bull. Bingham Ocean. Coll. III, Art. 3, p. 118.

Occurrence :

St. 96, Arabian Sea, N 200, 400–645 m. ; 1 (55 mm.).

St. 131A, Arabian Sea, N 200, 600–0 m. ; 1 (47 mm.).

Distribution.—Atlantic and Indian Oceans.

Diaphus rafinesquei (Cocco).

See Parr, 1928, *t.c.*, pp. 119, 131, figs. 25, 26 ; 1929, Proc. U.S. Nat. Mus. LXXVI, Art. 10, p. 32, fig. 16.

Occurrence :

St. 61A–B, Arabian Sea, N 100, 1500–0 m. ; 2 (15, 21 mm.). N 200, 2000–0 m. ; 10 (22–42 mm.).

St. 86, Arabian Sea, AT, 759–1024 m. ; 2 (37, 41 mm.).

St. 96, Arabian Sea, N 200, 400–645 m. ; 1 (44 mm.).

St. 131A, Arabian Sea, N 200, 600–0 m. ; 1 (45 mm.).

St. 193, Gulf of Aden, AT, 1061–1080 m. ; 1 (40 mm.).

Distribution.—Mediterranean, Atlantic, Indian and Pacific Oceans.

Remarks.—It seems probable that more than one form is represented among the specimens obtained by this expedition, but, in view of the small amount of material and the degree of variation recorded by Parr in *D. rafinesquei* from the Western Atlantic, I have preferred to include all of them under this name.

Diaphus cœruleus (Klunzinger).

See Parr, 1928, Bull. Bingham Ocean. Coll. III, Art. 3, p. 122.

Occurrence :

St. 35, Gulf of Aden, OT, 457–549 m. ; 2 (128, 137 mm.).

Distribution.—Indian and Pacific Oceans.

Diaphus splendidus (Brauer).

See Parr, 1928, *t.c.*, p. 123.

Occurrence :

St. 154, Maldive area, AT, 457 m. ; 1 (58 mm.).

St. 171, Arabian Sea, AT, 3840–3872 m. ; 1 (42 mm.).

Distribution.—Atlantic and Indian Oceans.

Diaphus garmani, Gilbert.

See Parr, 1928, *t.c.*, pp. 123, 145, fig. 33.

Occurrence :

St. 61A–B, Arabian Sea, N 100, 1000–0 m. ; 1 (30 mm.). N 200, 2000–0 m. ; 7 (23–32 mm.).

St. 172, Arabian Sea, N 200, 2091–0 m. ; 1 (31 mm.).

Distribution.—West Indies ; Arabian Sea (?).

Remarks.—These small specimens are very doubtfully referred to this species.

Diaphus sp.

Occurrence :

St. 35, Gulf of Aden, OT, 457–549 m. ; 1 (115 mm.).

St. 87, Arabian Sea, AT, 549–640 m. ; 1 (68 mm.).

St. 145, Maldive area, AT, 494 m. ; 1 (150 mm.).

Remarks.—The above specimens represent three distinct species of *Diaphus*, but I am unable to identify them specifically with the aid of the existing literature. In view of the confusion existing in this genus, and of the fact that Dr. Å. V. Tåning, of Copenhagen, is preparing a comprehensive monograph of the Myctophidæ based upon the extensive collections made by the " Dana ", I am loath to add further to this confusion by the addition of three new species of very doubtful validity, and prefer to be content with a generic determination for the purposes of this report. In the existing state of our knowledge of the species of this difficult genus, the identifications of the four species on p. 30 must be regarded as somewhat tentative.

Family Ateleopidæ.

Genus *Ateleopus*, Temminck & Schlegel.

Ateleopus, Temminck & Schlegel, 1846, in Siebold, Faun. Japon., Pisc. p. 255. (Not *Atelopus*, Duméril and Bibron, 1841.)

Podateles, Boulenger, 1902, Ann. Mag. Nat. Hist. (7) X, p. 403. (Substitute for *Ateleopus*, Temminck and Schlegel, regarded as preoccupied.)

Rivero (1935, 'Mem. Soc. Cub. Hist. Nat.' IX, p. 91) has recently dealt with the taxonomy of the family Ateleopidæ in some detail, and has shown that *Ateleopus* is well distinguished from *Ijimaia* by the form of the pelvic bones, as well as by the shorter pelvic fins. *Parateleopus*, Smith & Radcliffe, is closely related to *Ateleopus*, but the dorsal fin has only 3 rays.

Ateleopus natalensis, Regan.

Ateleopus natalensis, Regan, 1921, Ann. Mag. Nat. Hist. (9) VII, p. 414 ; Gilchrist, 1922, Rep. Fish. Mar. Biol. Surv. S. Afr., II, Spec. Rep. iii, p. 77 ; Barnard, 1925, Ann. S. Afr. Mus. XXI, p. 251, pl. x, fig. 3 ; Rivero, 1935, Mem. Soc. Cub. Hist. Nat. IX, p. 97.

Occurrence :

St. 115, Zanzibar area, OT, 640–658 m. ; 1 (620 mm.).

Distribution.—Off Natal coast, near Zanzibar ; in deep water.

Description.—Length of head about equal to its distance from origin of anal ; distance from tip of snout to origin of dorsal about 5, to origin of anal $2\frac{4}{5}$ to $3\frac{1}{4}$ in length of fish (without caudal fin). Diameter of eye 7 to 8 in length of head ; interorbital width about 4. 9 or 10 gill-rakers on lower part of anterior arch. Dorsal 9–10 ; height varying from about $\frac{3}{4}$ to more than $1\frac{1}{4}$ times the length of the head. Anal + caudal 102–110. Pectoral with 12 rays, $\frac{2}{3}$ to $\frac{4}{5}$ length of head. Pelvics $\frac{2}{3}$ to nearly as long as head.

Remarks.—In addition to the specimen mentioned above, this description includes the two types of the species, 480 and 540 mm. in total length. As suggested by Rivero, this

species may eventually prove to be identical with *A. japonicus*, of which I have been able to examine only three small specimens (240 to 260 mm.), but in the latter the distance from the tip of the snout to the origin of the dorsal is nearly 7 in the length of the fish, the pectoral fin is longer than the head, and there are 108 to 122 rays in the anal and caudal fins.

Ateleopus indicus, Wood-Mason & Alcock.

Ateleopus indicus, Wood-Mason & Alcock, 1891, Ann. Mag. Nat. Hist. (6) VIII, p. 123, fig. 3 ; 1892, Illustr. Zool. " Investigator ", pl. ii, fig. 2 ; Alcock, 1899, Cat. Indian Deep-sea Fish. p. 123 ; Rivero, 1935, *t.c.*, p. 96.

Occurrence :

St. 145, Maldive area, AT, 494 m. ; 4 (260–370 mm.).

Distribution.—Indian Ocean, Philippines ; in deep water.

Description.—Length of head about equal to its distance from origin of anal ; distance from tip of snout to origin of dorsal $4\frac{1}{5}$ to $4\frac{2}{3}$ in length of fish (without caudal fin). Diameter of eye 6 to $6\frac{3}{4}$ in length of head ; interorbital width about 4. 6 or 7 gill-rakers on lower part of anterior arch. Dorsal 8–10 ; height equal to or less than length of head. Anal + caudal 76–85. Pectoral with 12 rays, $\frac{3}{5}$ to $\frac{3}{4}$ length of head. Pelvics nearly $\frac{1}{2}$ length of head.

Remarks.—In addition to the above-mentioned examples, this description includes a specimen (270 mm.) from the Arabian Sea (8° 37′ N., 75° 37′ E.), at a depth of 420 to 530 metres, received from the Indian Museum.

Family Cetomimidæ.

Ditropichthys storeri (Goode & Bean).

See Parr, 1928, Bull. Bingham Ocean. Coll. III (3), p. 177, fig. 43 ; 1934, *ibid.* IV (6), p. 22, fig. 5.

Occurrence :

St. 156, Maldive area, AT, ? m. ; 1 (40 mm.).

Distribution.—Atlantic and Indian Oceans.

Remarks.—This rare species was not previously represented in the British Museum collection. The type, about 115 mm. in total length (U.S.N.M. No. 35634), was taken by the "Albatross " at Station 2222 (39° 03′ 15″ N., 70° 50′ 45″ W.), 2880 metres. The " Valdivia " obtained another specimen, 52 mm. long, from the Bay of Bengal, 2000 metres, and the " Pawnee " a third, 27 mm. in length (without caudal fin), from the Bahamas.

Family Muræniдæ.

Gymnothorax pictus (Ahl).

Occurrence :

St. 43, South Arabian Coast, OT, 83–100 m. ; 1 (400 mm.).

Distribution.—East Africa, through the Indian Ocean and Archipelago, to Australia and the Pacific.

Family Serrivomeridæ.

Genus *Serrivomer*, Gill & Ryder.

Serrivomer, Gill & Ryder, 1884, Proc. U.S. Nat. Mus. VI (1883), p. 260. Type: *S. beanii*, Gill & Ryder.
Alcockidia, Gilbert, 1905, Bull. U.S. Fish. Comm. XXIII (1903), p. 586. Type: *Gavialiceps microps*, Alcock.*
Paraserrivomer, Roule & Angel, 1931, Bull. Inst. océan. Monaco, No. 581, p. 2; 1933, Rés. Camp. Sci. Monaco, LXXXVI, p. 69. Type: *Gavialiceps hasta*, Zugmayer.

Trewavas (1932, 'Proc. Zool. Soc. Lond.', p. 652) has suggested that *Gavialiceps microps*, Alcock, is probably a *Serrivomer*, and I have very little doubt that this is the case. The pectoral fins in this genus are very small and fragile, and are liable to be torn off when the fish is captured. After examining two specimens of *Paraserrivomer hasta*, which formed part of the material studied by Roule and Angel, I cannot see any reason for maintaining this genus as distinct from *Serrivomer*. The structure of the rays in the anal fin in this species appears to be exactly the same as in *S. microps* and *S. beanii*, and the remaining characters of the genus *Paraserrivomer* given by Roule and Angel cannot be regarded as of more than specific importance.

Serrivomer microps (Alcock).

Gavialiceps microps, Alcock, 1889, Ann. Mag. Nat. Hist. (6) IV, p. 460; 1892, *ibid.* (6) X, p. 364; 1899, Cat. Indian Deep-sea Fish. p. 192.
Serrivomer sector, Garman, 1899, Mem. Mus. Comp. Zoöl. XXIV, p. 320, pl. lxiii; Brauer, 1906, "Valdivia" Tiefsee-Fische, p. 132, pl. viii, fig. 4; Lloyd, 1909, Mem. Ind. Mus. II, p. 152; Weber and Beaufort, 1916, Fish. Indo-Austral. Arch. III, p. 332, figs. 159, 160; Townsend and Nichols, 1925, Bull. Amer. Mus. Nat. Hist. LII, p. 12; Beebe and Crane, 1936, Zoologica, N.Y., XX, p. 63.
Serrivomer beanii, Gilbert, 1905, Bull. U.S. Fish. Comm. XXIII (1903), p. 586.
Serrivomer sector (part), Roule & Bertin, Ocean. Rep. Danish "Dana"-Exped. 1920–22, No. 4, p. 39.

Occurrence:

St. 119, Zanzibar area, AT, 1207–1463 m.; 1 (*c.* 465 mm.).
St. 156, Maldive area, AT, ? m.; 1 (355 mm.).

* There is some doubt concerning the type species of the genus *Gavialiceps*, and the strict application of the Rules of Nomenclature unfortunately produces a result which is clearly in opposition to the intention of the author of the genus. Alcock originally proposed the genus as follows: "*Gavialiceps*, gen. nov., Wood-Mason, MS.," and included two species—(1) *G. tæniola*, sp. nov., Wood-Mason, MS., and (2) *G. microps*, sp. nov. The fact that the first of these species was based upon a manuscript name of Wood-Mason might be held to indicate the recognition of this species as the genotype, but the subsequent action of Alcock is contrary to this view. In 1891 ('Ann. Mag. Nat. Hist.' ser. 6, VIII, p. 135) he deals further with *Gavialiceps tæniola*, and states: "This species was described from immature individuals and was included with *Gavialiceps microps* in a new genus. The examination of full-grown individuals . . . shows that this species has no place in the genus *Gavialiceps*, which is a true Nemichthyine form without pectoral fins, and that it ought to be ranked with *Nettastoma*." That is to say, Alcock himself removed *tæniola* from the genus *Gavialiceps*, leaving *microps* as its sole representative. In 1899 ('Cat. Indian Deep-sea Fish.' p. 191) Alcock re-defines the genus *Gavialiceps*, with *microps* as the only species. Common sense would suggest that this action of Alcock's amounted to an indication that he regarded *tæniola* as a *Nettastoma* and looked upon *microps* as the type of his genus *Gavialiceps*, but under the International Rules this cannot be regarded as a designation of a genotype for *Gavialiceps* (see Article 30 and Opinion 6). Such a definite designation is first made by Gilbert (1905, 'Bull. U.S. Fish. Comm.' XXIII, 1903, p. 586), who states that "there is no doubt that *G. tæniola* must be considered the type of the genus, and this would become a synonym of *Nettastoma* if Alcock's later views are correct . . ." Further on he says: "For the Nemichthyoid genus, without pectoral fins, typified by *Gavialiceps microps*, to which Alcock erroneously restricts the genus *Gavialiceps*, I would propose the name *Alcockidia* . . ." Jordan (1920, 'Genera Fish.' IV, p. 444) gives *tæniola* as the orthotype of *Gavialiceps*.

Distribution.—Indian and Pacific Oceans.

Remarks.—Beebe and Crane have shown clearly the differences between this species and *S. beanii* and *S. brevidentatus*, both of which occur in the Atlantic. There seems to be little doubt that Alcock's species is identical with that described by Garman as *Serrivomer sector*. In the smaller of the two specimens mentioned above I count about 155 rays in the anal fin, and there appear to be more than 50 vomerine teeth.

Family Nemichthyidæ.

Avocettinops schmidti, Roule & Bertin.

Avocettinops schmidti, Roule & Bertin, 1929, Ocean. Rep. Danish "Dana"-Exped. 1920–22, No. 4, p. 30, pl. i, fig. 1, text-figs. 13, 14.

Occurrence :

St. 119, Zanzibar area, AT, 1207–1463 m. ; 1 (300 mm.).

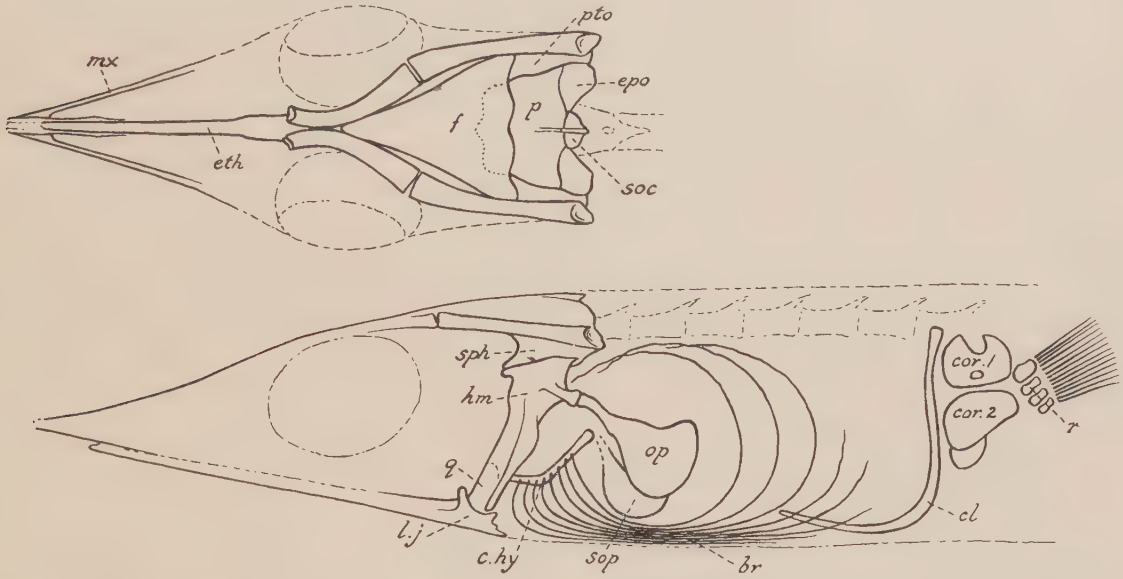
Distribution.—Caribbean Sea, near Zanzibar ; in deep water.

Remarks.—The occurrence of a second specimen of this fish, believed by Roule and Bertin to be perhaps a teratological form of *Avocettina*, is of considerable interest. Unfortunately the example collected by the "Mabahiss" is very badly damaged, the head being nearly torn away from the body and the posterior part of the tail missing. Nevertheless, the head itself is nearly perfect, and it has been possible to stain this with alizarin and clear in caustic potash solution, and thus to obtain a good idea of the osteology of the cranium, suspensorium, pectoral arch, etc.

The original diagnosis of the genus *Avocettinops* runs as follows : Body elongate and ribbon-like as in *Avocettina*. Snout pointed, about $\frac{1}{4}$ length of head, progressively narrowed in front of eyes. Lower jaw shorter than the upper, and largely concealed by the edge of the latter. No teeth. Anterior nostril with a long, forwardly directed tube. Trunk with a narrow neck-like region behind the head. No caudal filament. Gill-openings distinctly separated below. Lateral line with a single series of large pores. Pectorals well developed, each with two parallel rows of rays. Dorsal extending from above the head to the extremity of the tail. Anal commencing immediately behind the vent, far from the pectorals, and extending to the extremity of the tail. A caudal fin.

To this diagnosis may be added the following osteological characters : Frontals completely united, without apparent median suture, including a bony tube for the supra-orbital sensory canal; parietals united by suture; supraoccipital present. Pterotics large, including a tube for a sensory canal, which extends forward above the alisphenoid, overlaps the frontals, but does not project behind as a posterior wing of the skull ; sphenotic with a spinous process projecting outwards and forwards. Component bones of the snout not distinguishable. Maxillary articulating with the snout near its tip, somewhat expanded opposite anterior part of orbit. Suspensorium not very broad, directed a little obliquely forwards ; hyomandibular and quadrate well ossified and firmly united ; no bony palato-pterygoid. Operculum expanded behind, with rounded posterior margin and concave upper margin ; a well-developed suboperculum. Branchiostegal rays 9 or 10 in number, loosely attached to the bony ceratohyal, the upper rays much bowed round the operculum. A long curved rod-like cleithrum, but apparently no supracleithrum ; hyper- and hypocoracoid well ossified ; four hour-glass-shaped radials.

The two parallel rows of pectoral fin-rays mentioned by Roule and Bertin seem to be the paired components of the normal rays rather more widely separated than is usual. The condition shown in the figures published by these authors, in which the fin has the appearance of being split almost to its base, is perhaps a post-mortem one, but unfortunately the fins of the present example are too badly damaged to verify this point. It may be pointed out that in the specimen of *Stilbiscus bahamensis* stained with alizarin, which was described by Trewavas (1932, 'Proc. Zool. Soc. Lond.' p. 642, pl. i, text-figs.



Text-fig. 8.—Dorsal view of skull, lateral view of suspensorium, opercles, and pectoral arch of *Avocettinops schmidti*. *br.*, branchiostegal rays; *c.hy.*, ceratohyal; *cl.*, cleithrum; *cor.*, coracoid; *epo.*, epiotic; *eth.*, ethmoid, or ethmo-vomer; *f.*, frontal; *hm.*, hyomandibular; *l.j.*, lower jaw; *mx.*, maxillary; *op.*, operculum; *p.*, parietal; *pto.*, pterotic; *q.*, quadrate; *r.*, radial of pectoral fin; *soc.*, supraoccipital; *sop.*, suboperculum; *sph.*, sphenotic.

3–6), the pectoral fin shows the same double appearance of the basal parts of the pectoral rays.

Roule and Bertin placed this genus in their suborder Nemichthydiformes, and erected a new family, Avocettinopsidæ, for its reception. However, comparing its cranial osteology with that of *Nemichthys*, *Avocettina*, *Labichthys* (Beebe & Crane, 1937, 'Zoologica', N.Y., XXII, pp. 353, 366, 375, text-figs. 6–8, 12–15, 19–22) and *Nematoprora* (Trewavas, 1932, *t.c.*, p. 648, pl. ii), all of the family Nemichthyidæ, I find only comparatively small and unimportant differences. Apart from the unproduced, toothless jaws, *Avocettinops* seems to be a typical Nemichthyid, and the diagnosis of the family given by Beebe and Crane (1937, *t.c.*, p. 350) should be emended to allow of its inclusion.

Family Nettastomidæ.

Genus *Gavialiceps*, Alcock.

Gavialiceps, Alcock (*ex* Wood-Mason MS.), 1889, Ann. Mag. Nat. Hist. (6) IV, p. 460. *Type: Gavialiceps tæniola*, Alcock (*ex* Wood-Mason MS.). Not *Gavialiceps*, Alcock, 1891, 1899—see footnote, p. 33.

Body scaleless, with the tail tapering to a point. Lateral line conspicuous, consisting of a row of large pores. Snout much produced, depressed; anterior nostril tubular,

placed on edge of snout at some distance from its tip; posterior nostril a simple oval opening, nearly equidistant from eye and tip of snout. Jaws with bands of small sharp teeth; vomer with a median series of stronger teeth, sometimes with traces of a row of very small teeth on either side. Gill-openings rather wide, narrowly separated from one another. Vertical fins well developed; dorsal commencing a little in advance of the gill-opening; no pectorals. No air-bladder. Stomach with a very long cæcal appendage.

This genus differs from *Nettastoma*, *Saurenchelys*,* *Nettenchelys*, *Venefica* and *Metopomycter* in the larger and more closely approximated gill-openings, in the position of the nostrils, and in the form of the vomerine teeth. It may be distinguished from *Nettastomops* by the position of the nostrils, the bands of teeth in the jaws, and by the absence of fleshy tentacles at the tip of the snout and at the termination of the lower jaw.

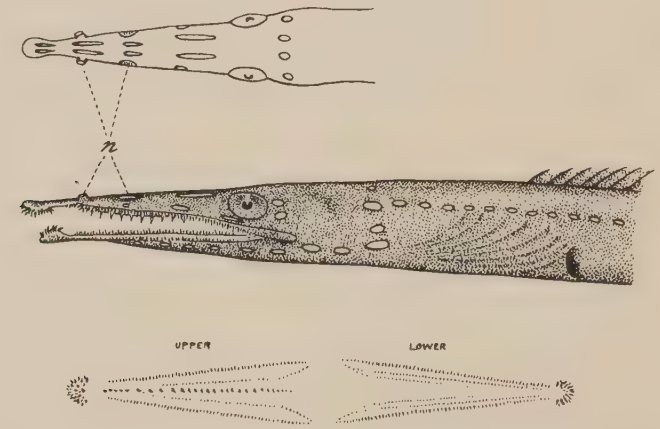
Gavialiceps tæniola, Alcock.

Gavialiceps tæniola, Alcock (*ex* Wood-Mason MS.), 1889, Ann. Mag. Nat. Hist. (6) IV, p. 460.
Nettastoma tæniola, Alcock, 1891, *ibid.* (6) VIII, p. 135.
Saurenchelys tæniola, Alcock, 1899, Cat. Indian Deep-sea Fish. p. 206; 1900, 1905, Illust. Zool. "Investigator", pls. xxxiv, fig. 2, xxxvi, fig. 1.

Occurrence:

St. 35, Gulf of Aden, OT, 457–549 m.; 38 (360–570 mm.).
St. 54, South Arabian Coast, AT, 1046 m.; 1 (620 mm.).
St. 143, Maldive area, AT, 797 m.; 1 (840 mm.).
St. 176, Gulf of Aden, AT, 655–732 m.; 1 (510 mm.).

Distribution.—Indian Ocean.



Text-fig. 9.—*Gavialiceps tæniola*. Head and anterior part of body and dentition. × 1. *n.*, nostrils.

Description.—Length of head $1\frac{2}{5}$ to 2 in that of trunk, length of head + trunk $2\frac{3}{4}$ to more than 3 in that of fish. Length of snout about 5 times diameter of eye and $2\frac{1}{2}$ to $2\frac{3}{4}$ in length of head. Upper jaw projecting distinctly beyond the lower, without a prominent cutaneous flap; cleft of mouth extending to or beyond hinder part of eye; bands of small, sharp teeth in each jaw, that of upper jaw with a median longitudinal edentulous space; a patch of somewhat enlarged teeth at tip of upper jaw, separated from the more

* Erroneously regarded by some authors as synonymous with *Chlopsis*, Rafinesque.

posterior bands by a notch, into which fits a patch of similarly enlarged teeth on the expanded tip of the lower jaw. Anterior edge of tongue just free. Uniformly blackish ; the young are said to be silvery.

Remarks.—This species was originally described from four examples, the largest about 265 mm. in total length, from the Bay of Bengal (19° 35′ N., 92° 24′ E.), at a depth of 510 metres, and from the Andaman Sea (7 miles south-east by south of Ross Island), at a depth of 495 metres.

Venefica proboscidea (Vaillant).

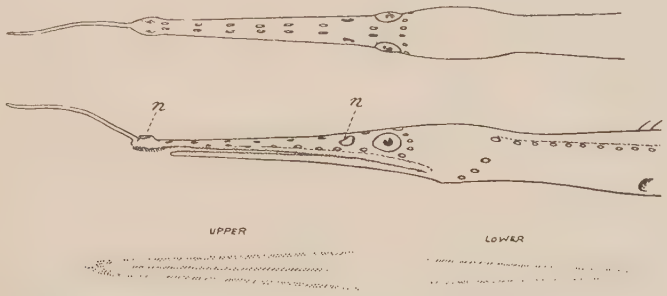
Nettastoma proboscidium, Vaillant, 1888, Exp. " Travailleur " and " Talisman ", Poiss. p. 84, pl. vii, fig. 3 ; Lloyd, 1909, Mem. Ind. Mus. II, p. 151 ; Barnard, 1925, Ann. S. Afric. Mus. XXI, p. 194.

Occurrence :

St. 62, Arabian Sea, AT, 1893 m. ; 1 (*c.* 510 mm.).

Distribution.—Off Atlantic coast of Morocco, 2200 m. ; Off Cape Point, South Africa, 1240 m. ; Arabian Sea, 1893 m. ; Gulf of Manaar, 1665 m.

Description.—Length of head (without rostral process) $3\frac{1}{2}$ in that of head + trunk, which is about $1\frac{3}{4}$ in that of tail. Length of snout nearly $\frac{1}{2}$ that of head, and more than



Text-fig. 10.—*Venefica proboscidea*. St. 62. Head and anterior part of body and dentition. × $1\frac{1}{4}$. *n.*, nostrils.

9 times diameter of eye ; rostral process about 5 times diameter of eye. Posterior nostril situated nearly an eye's diameter in front of eye. Cleft of mouth extending to a little behind the eye ; upper jaw projecting well beyond the lower ; teeth all small, with their points directed backwards ; none of the teeth enlarged. Origin of dorsal fin above gill-openings. Uniformly black.

Remarks.—This species may be readily distinguished from *V. procera* (Goode & Bean) by the longer rostral process and by the position of the posterior nostril. As shown in the figure of *V. procera* given by Weber and Beaufort (1916, 'Fish. Indo-Austral. Arch.' III, fig. 119) this nostril lies at the upper part of the anterior margin of the eye. The type of *V. proboscidea* was somewhat mutilated, and measured 960 mm. in total length.

Family Congridæ.

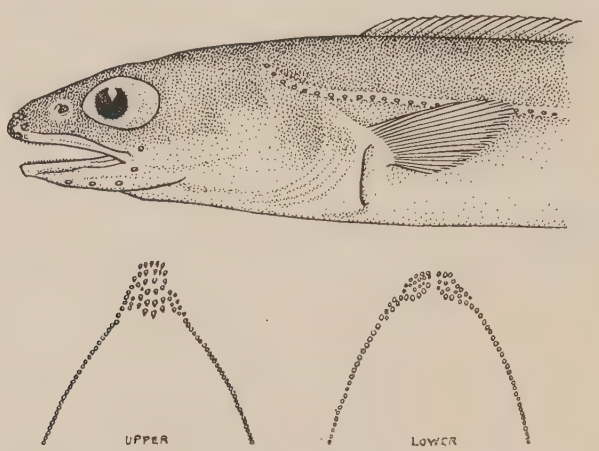
Conger maldivensis, sp. n.

Occurrence :

St. 145, Maldive area, AT, 494 m. ; 3 (300–352 mm.). Holotype, 352 mm.

Distribution.—Near the Maldives.

Description.—Body subcylindrical anteriorly, compressed posteriorly. Lateral line conspicuous. Depth of body about 10 in the total length, length of head (to upper angle of gill-openings) $5\frac{1}{2}$ to nearly 6; length of head + trunk about $1\frac{1}{2}$ in that of tail. Snout broader than long, about as long as eye, diameter of which is a little greater than interocular width and 4 to $4\frac{1}{3}$ in length of head. Anterior nostril with a short tube, close to end of snout; posterior nostril a little in front of eye and level with its lower part. Mouth cleft extending to below middle of eye; upper jaw projecting a little beyond lower, but teeth in upper jaw scarcely visible when the mouth is closed. Teeth in jaws in two



Text-fig. 11.—*Conger maldivensis*. Head and anterior part of body and dentition of holotype. × $1\frac{1}{4}$.

irregular series anteriorly, in a single series laterally; anterior teeth conical, lateral teeth with truncated tips, close-set, forming a more or less continuous cutting edge; præmaxillary and vomerine teeth united to form a single oval patch, without backward extension. Origin of dorsal above or slightly behind base of pectoral. Pectoral nearly twice as long as diameter of eye. Yellowish-brown, paler below, without evident markings; all the fins yellowish.

Remarks.—This species is placed provisionally in the genus *Conger*, but the limits of *Conger*, *Ariosoma*, etc., are by no means clearly understood. In many respects the species seems to lie between *Conger* and *Coloconger*. From the known species of *Conger* it may be distinguished by the shorter body, the short and broad snout, and by the more anterior origin of the dorsal fin.

Ariosoma guttulata (Günther).

Congromuræna guttulata, Günther, 1887, Deep-sea Fish, "Challenger", p. 252.
Congromuræna longicauda (*non* Ramsay & Ogilby), Alcock, 1889, Ann. Mag. Nat. Hist. (6) IV, p. 455; 1892, Illustr. Zool. "Investigator", pl. vii, fig. 5.
Congromuræna macrocercus, Alcock, 1894, J. Asiat. Soc. Bengal, LXIII (2), p. 134; 1899, Cat. Indian Deep-sea Fish. p. 198.
Congrellus guttulatus, Ogilby, 1898, Proc. Linn. Soc. N.S. Wales, XXIII, p. 292.
Bathycongrus macrocercus, Ogilby, 1898, *t.c.*, p. 293.
Congermuræna æquorea, Gilbert & Cramer, 1897, Proc. U.S. Nat. Mus. XIX, p. 405, pl. xxxvii.
Leptocephalus æquoreus, Gilbert, 1905, Bull. U.S. Fish. Comm. XXIII (1903), p. 584.
Conger guttulata, Fowler, 1928, Mem. B.P. Bishop Mus. X, p. 39.

Occurrence :

St. 34, Gulf of Aden, AT, 1022 m. ; 1 (420 mm.).
St. 35, Gulf of Aden, OT, 457–549 m. ; 1 (273 mm.).
St. 54, S. Arabian Coast, AT, 1046 m. ; 2 (285, 360 mm.).
St. 145, Maldive area, AT, 494 m. ; 3 (120–123 mm.).
St. 176, Gulf of Aden, AT, 655–732 m. ; 1 (325 mm.).
St. 184, Gulf of Aden, AT, 1270 m. ; 1 (590 mm.).
St. 193, Gulf of Aden, AT, 1061–1080 m. ; 1 (327 mm.).

Distribution.—Indo-Pacific ; in deep water.

Description.—Depth of body 16 to 18 in the total length, length of head (to upper angle of gill-opening) a little less than that of trunk, and $5\frac{3}{4}$ to $6\frac{1}{2}$ in total length ; length of head + trunk $1\frac{3}{5}$ to nearly twice in that of tail. Snout $1\frac{1}{2}$ to twice as long as eye, diameter of which is greater than interocular width and 6 to 7 in length of head. Anterior nostril with a tube, close to end of snout ; posterior nostril a little in front of and level with middle of eye. Mouth cleft extending to below middle of eye ; upper jaw projecting beyond the lower, the præmaxillary patch of teeth nearly entirely visible when the mouth is closed. Teeth in jaws pointed, in bands ; præmaxillary patch separated from teeth on vomer by a transverse groove which receives the tip of the mandible ; vomerine teeth forming a rounded patch, without backward extension, one or more of the teeth in the middle somewhat enlarged. Origin of dorsal above or a little behind gill-opening. Length of pectoral $3\frac{1}{4}$ to nearly 4 in that of head. Brownish ; smaller specimens sometimes paler below ; young yellowish, with series of small black dots above and below lateral line ; fins pale in young, becoming greyish or blackish with age.

Remarks.—In addition to the specimens listed above, this description includes the type of the species, 185 mm. in total length, from the Island of Matuku, Fiji Group, 590 metres ; and an example, 360 mm. in total length, from the Bay of Bengal, 505 metres, received from the Zoological Survey of India as *Congromuræna longicauda*. *Congermuræna æquorea* was originally described from two specimens, 410 and 470 mm. in length, from near the Hawaiian Islands, at a depth of about 700 metres.

Ariosoma nigrimanus, sp. n.

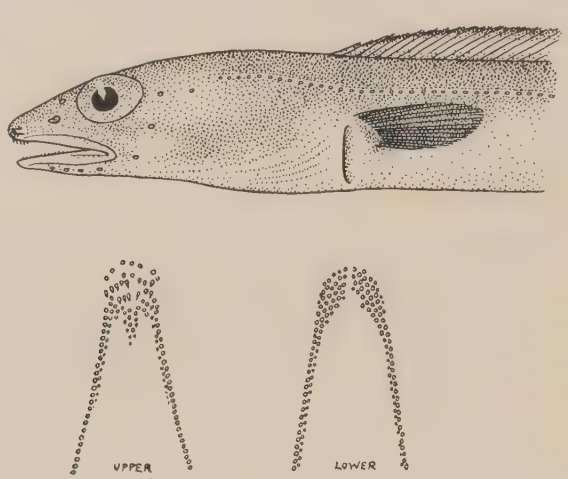
Occurrence :

St. 194, Gulf of Aden, AT, 220 m. ; 3 (240–335 mm.). Holotype, 300 mm.

Distribution.—Gulf of Aden.

Description.—Depth of body $11\frac{1}{2}$ to 12 in the total length, length of head (to upper angle of gill-opening) 5 to $5\frac{1}{4}$; length of head + trunk equal to or a little shorter than that of tail. Snout about as broad as long, as long as eye, diameter of which is a little greater than interocular width and 5 in length of head. Anterior nostril with a short tube, close to end of snout ; posterior nostril a little nearer to eye than to anterior nostril and level with lower part of eye. Mouth-cleft extending to below middle of eye or not quite as far ; upper jaw projecting a little beyond lower, the anterior teeth of the præmaxillary patch visible when the mouth is closed. Teeth pointed or granular in both jaws, in several series anteriorly, becoming biserial and finally uniserial laterally ; an elongate patch of granular or bluntly-pointed vomerine teeth, tapering posteriorly, not extending backwards beyond level of posterior nostril. Origin of dorsal above or a little in

advance of gill-opening. Length of pectoral $2\frac{3}{5}$ to $2\frac{2}{3}$ in that of head. Yellowish brown, paler below; traces of faint dusky cross-bars on head; dorsal, anal and caudal with a narrow black margin; pectorals wholly dusky or blackish.



TEXT-FIG. 12.—*Ariosoma nigrimanus*. Head and anterior part of body and dentition of holotype. × $1\frac{1}{4}$.

REMARKS.—This species falls within the group which includes *A. anago* (Schlegel), *A. obud*, Herre, *A. brachyrhynchus*, Fowler, *A. meeki* (Jordan & Snyder), *A. howensis* (McCulloch and Waite), and *A. bowersi* (Jenkins). It seems to be most nearly related to the last named, differing chiefly in the somewhat smaller eye, in the different proportions of the head, trunk and tail, and in the longer and dark-coloured pectorals.

Ariosoma sp.

OCCURRENCE:

St. 80, S. Arabian Coast, SD 4, 16–22 m.; 46 (60–85 mm.).

St. 105, Zanzibar area, AT, 238–293 m.; 1 (97 mm.).

REMARKS.—These young specimens appear to be referable to this genus, but cannot be identified with certainty.

Bathyuroconger braueri (Weber & Beaufort).

Uroconger vicinus (*non* Vaillant), Alcock, 1892, Ann. Mag. Nat. Hist. (6) X, p. 363; 1899, Cat. Indian Deep-sea Fish. p. 200.

Uroconger lepturus (*non* Richardson), Brauer, 1906, "Valdivia" Tiefsee-Fische, p. 124; Sewell, 1912, Rec. Ind. Mus. VII, p. 12.

Uroconger braueri, Weber & Beaufort, 1916, Fish. Indo-Austral. Arch. III, p. 266.

Uroconger (*Bathyuroconger*) *braueri*, Fowler, 1934, Proc. Acad. Nat. Sci. Philad. LXXXV, p. 273.

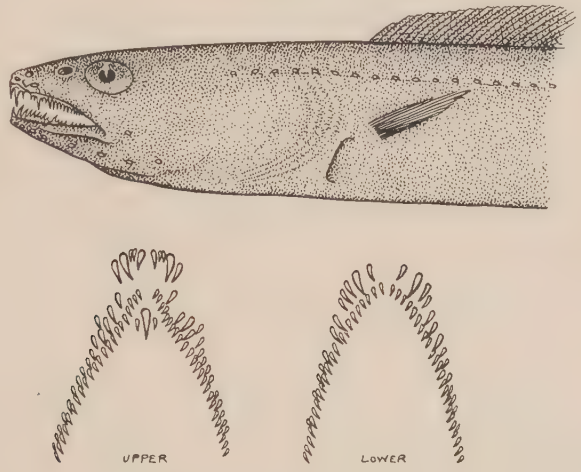
OCCURRENCE:

St. 145, Maldive area, AT, 494 m.; 1 (237 mm.).

DISTRIBUTION.—Indian Ocean, 494 to 1100 metres.

DESCRIPTION.—Depth of body about 13 in the total length, length of head (to upper angle of gill-opening) $7\frac{1}{4}$ to $7\frac{3}{4}$; length of head + trunk nearly twice in that of tail. Snout a little longer than broad, $1\frac{3}{4}$ times as long as eye, diameter of which is about equal to

interocular width and $6\frac{1}{4}$ to $7\frac{1}{4}$ in length of head. Anterior nostril with a short tube, close to end of snout; posterior nostril a little in front of and level with upper part of eye. Mouth-cleft extending to below posterior part of eye; upper jaw scarcely projecting. Teeth in jaws in two irregular series laterally; teeth of præmaxillaries and front of lower jaw enlarged and canine-like, those of the præmaxillary patch separated from the remainder by an edentulous groove; one or two large canine-like teeth on the front of the vomer, and sometimes two or more smaller teeth in addition. Interspace between the gill-openings greater than their length. Origin of dorsal just behind gill-opening. Pectoral with 15 to 17 rays, length $\frac{1}{4}$ to $\frac{1}{2}$ that of head. Brownish; smaller specimens with irregular series of small black dots above and below the lateral line; mouth-cavity blackish.



Text-fig. 13.—*Bathyuroconger braueri*. Specimen from Travancore coast (B.M.). Head and anterior part of body and dentition. × $\frac{1}{2}$.

Remarks.—In addition to the specimen listed above, this description includes a large example, 600 mm. in total length, from off the Travancore Coast, at 760 metres, identified by Alcock as *Uroconger vicinus*, Vaillant. Barnard (1925, 'Ann. S. Afr. Mus.' XXI, p. 193) has expressed doubt as to whether the Atlantic and Indian species are really distinct, and the differences between *vicinus* and *braueri* have certainly not been clearly demonstrated. In *vicinus* the length of the head appears to be more than 11 in the total length of the fish, and there may be fewer rays in the pectoral fin, although Vaillant does not give the number in his original description. In two specimens from off Cape Point, 645 metres, identified by him as *vicinus*, Barnard gives the head to length proportions as 1 : 8 and 1 : $8\frac{1}{2}$, and the number of rays in the pectoral fin as 9.

Reid (1934, 'Smithson. Misc. Coll.,' XCI, No. 15, p. 4) has given good reasons for maintaining this genus as distinct from *Uroconger*.

Uroconger lepturus (Richardson).

For synonymy and description see Weber and Beaufort, 1916, *t.c.*, p. 265, figs. 113, 114.

Occurrence:

St. 70, Gulf of Oman, OT, 196 m.; 2 (230, 323 mm.).

Distribution.—Gulf of Oman, Indian Ocean and Archipelago, Philippines, China Sea, etc.

Coloconger raniceps, Alcock.

Coloconger raniceps, Alcock, 1889, Ann. Mag. Nat. Hist. (6) IV, p. 456 ; 1892, Illust. Zool. " Investigator ", pl. vii, fig. 4 ; 1899, Cat. Indian Deep-sea Fish. p. 196 ; Lloyd, 1909, Mem. Ind. Mus. II, p. 152 ; Sewell, 1912, Rec. Ind. Mus. VII, p. 12.

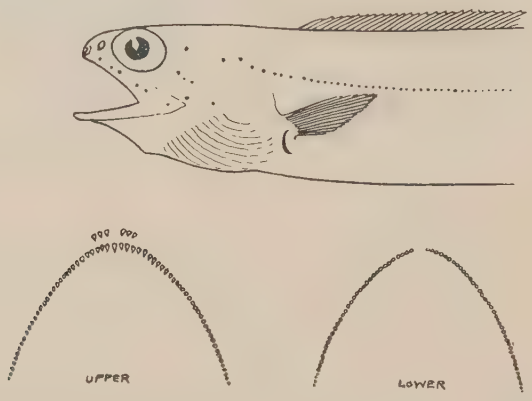
Occurrence :

St. 34, S. Arabian Coast, AT, 1022 m. ; 1 (340 mm.).

St. 115, Zanzibar area, OT, 640–658 m. ; 3 (220–410 mm.).

Distribution.—Indian Ocean ; in deep water.

Description.—Depth of body $6\frac{1}{3}$ to 7 in the total length, length of head $4\frac{2}{3}$ to 5 ; length of head + trunk distinctly greater than that of tail. Snout shorter than eye, diameter of which is equal to or greater than interocular width and 4 to $4\frac{1}{4}$ in length of



Text-fig. 14.—*Coloconger raniceps*. Head and anterior part of body and dentition. × ½.

head. Anterior nostril with a short tube, close to end of snout ; posterior nostril about midway between anterior nostril and eye, level with middle or upper part of eye. Mouth-cleft extending to beyond middle of eye ; upper jaw scarcely projecting. Both jaws with a single row of teeth, with the bases in contact and with the points directed posteriorly ; teeth of two sides of upper jaw united anteriorly by a transverse row, the whole forming a continuous series ; two præmaxillary patches, each of 2 to 4 conical teeth, widely separated from the remainder by an edentulous space. Origin of dorsal above or a little behind base of pectoral. Length of pectoral about ½ that of head. Uniformly brown or black.

Family Ophichthyidæ.

Ophichthus multiserialis, sp. n.

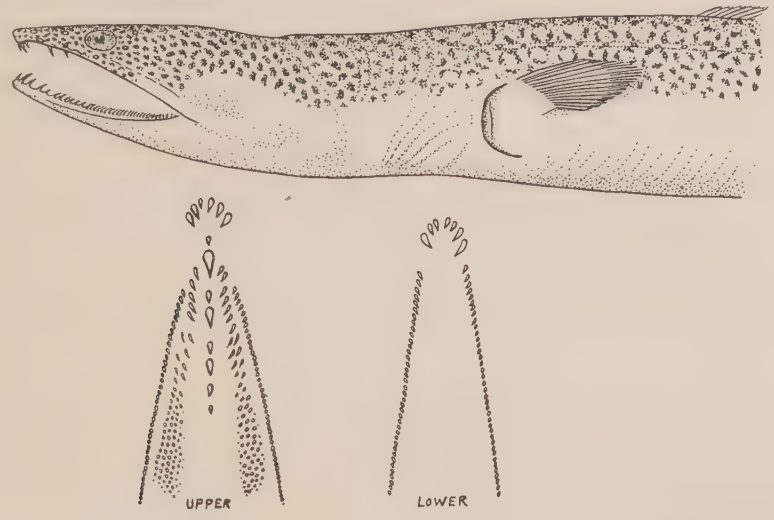
Occurrence :

St. 194, Gulf of Aden, AT, 220 m. ; 1 (625 mm.). Holotype.

Distribution.—Gulf of Aden.

Description.—Depth of body about 22, length of head (to upper angle of gill-opening) a little more than 7 ; length of head + trunk a little longer than that of tail. Snout narrow, pointed, twice as long as diameter of eye and nearly 7 in length of head. Mouth-cleft extending to well beyond eye, a little more than ⅓ length of head ; upper jaw projecting, the præmaxillary teeth visible when the mouth is closed. Teeth all sharply pointed ; upper jaw with an outer series of close-set, curved teeth, with their points directed

posteriorly ; inside this row are slender, pointed teeth, which are arranged in a single series anteriorly, and in about 6 series posteriorly ; the anterior teeth somewhat larger than the remainder ; a group of 5 or 6 strong præmaxillary teeth, separated from the rest by a



TEXT-FIG. 15.—*Ophichthus multiserialis.* Head and anterior part of body and dentition of holotype. × 1¼.

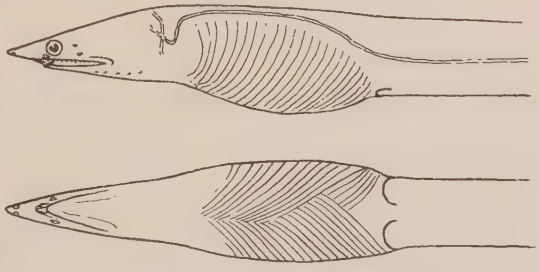
groove which receives the tip of the lower jaw ; lower jaw with a single series of teeth laterally, similar to those of the outer row in the upper jaw, and with some larger canine-like teeth anteriorly ; a single series of strong teeth on the vomer, decreasing in size posteriorly. Origin of dorsal a little behind end of pectoral, which is about ¼ length of head. Yellowish-brown ; upper parts with numerous small dark brown spots, which are smaller and closer together on the head.

Sphagebranchus omanensis, sp. n.

OCCURRENCE :

St. 72, Gulf of Oman, AT, 73 m. ; 1 (230 mm.). Holotype.

DISTRIBUTION.—Gulf of Oman.



TEXT-FIG. 16.—*Sphagebranchus omanensis.* Dorsal and lateral views of head and anterior part of body of holotype. × 3.

DESCRIPTION.—Depth of body about 55 in the total length ; length of head (from lower end of gill-opening) 8 in that of trunk, length of head + trunk nearly 1½ times that of tail. Snout nearly twice as long as eye and about 9 in length of head ; eye situated a little in front of middle of cleft of mouth. Anterior nostril without a tube, below anterior

part of snout; posterior nostril a slit in upper lip, below eye. Upper jaw strongly projecting; mouth-cleft extending about two eye-diameters behind eye. Teeth acute, recurved, uniserial in both jaws; a præmaxillary group of 4 larger, depressible teeth, completely visible when the mouth is closed; vomerine teeth irregularly biserial anteriorly, uniserial posteriorly. Gill-openings almost vertical, separated by an interspace which is less than their length. Dorsal and anal fins well developed on hinder part of body; origin of dorsal just behind the vent. Greyish-brown, paler below; head pale, variegated with dark brown.

Remarks.—Apparently related to *S. klazingai*, Weber, but readily distinguished by the different proportions of the head, trunk and tail, and by the greater development of the dorsal and anal fins.

Family Dysommidæ.

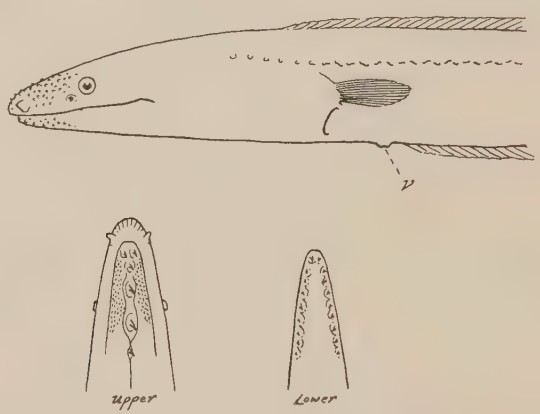
Dysomma zanzibarensis, sp. n.

Occurrence:

St. 106, Zanzibar area, AT, 183–194 m.; 3 (245–308 mm.). Holotype, 308 mm.

Distribution.—Near Zanzibar.

Description.—Depth of body about 17 in the total length, length of head (to lower angle of gill-opening) $7\frac{1}{4}$ to $7\frac{1}{2}$; length of head + trunk about 5 in that of tail. Vent situated between or just behind tips of pectorals, at a distance from gill-openings which is rather less than length of snout. Snout $3\frac{1}{2}$ times diameter of eye, $1\frac{1}{2}$ times interocular



Text-fig. 17.—*Dysomma zanzibarensis*. Head and anterior part of body and dentition of holotype. × 1.

width, and about 4 in length of head. Anterior nostril with a tube; posterior nostril simple, less than $\frac{1}{2}$ diameter of eye. Mouth-cleft extending to well beyond eye, less than $\frac{1}{2}$ length of head. Maxillary with a rather broad band of villiform teeth; mandible with 9 well-separated conical teeth, which are smaller than those on the vomer; 2 conical teeth set transversely at anterior end of upper jaw, followed by 4 on the vomer, of which the third is the largest; all the canine teeth embedded in conical fleshy papillæ, with only their points projecting. Gill-openings just in front of bases of pectorals, separated by an interspace which is subequal to their length. Origin of dorsal a little in advance of gill-openings. Length of pectoral $\frac{1}{5}$ to $\frac{1}{4}$ that of head. Greyish-brown, paler below; all the

median fins edged with white ; base of posterior part of anal and greater part of caudal deep black ; pectorals pale.

Remarks.—This species is most nearly related to *D. anguillaris*, Barnard, and *D. japonicus*, Matsubara, differing from the former in the position of the vent, the broader bands of teeth in the upper jaw, and the relative sizes of the eye and the posterior nostril, and from the latter chiefly in the larger eye and longer pectoral fins. All these species are well separated from *D. bucephalus*, Alcock, which has a much shorter form and a row of small teeth in each mandible.

Family Synaphobranchidæ.

Synaphobranchus (*Synaphobranchus*) *brevidorsalis*, Günther.

Synaphobranchus brevidorsalis, Günther, 1887, Deep-sea Fish. " Challenger ", p. 255, pl. lxiii, fig. c.
Synaphobranchus pinnatus var. *brevidorsalis*, Lloyd, 1909, Mem. Ind. Mus. II, p. 152 ; Illust. Zool. " Investigator ", pl. xlvii, fig. 1.

Occurrence :

St. 118, Zanzibar area, AT, 1789 m. ; 3 (155, 165, 390 mm.).

St. 159, Maldive area, MT, 914–1463 m. ; 1 (548 mm.).

Distribution.—Indo-Pacific.

Remarks.—As has been pointed out elsewhere (Norman and Trewavas, 1938, 'Ann. Mag. Nat. Hist.' ser. 11, III, p. 352), it seems probable that more than one species has been included under this name, but that, owing to the small amount of material available, it is difficult to attempt any further subdivision at present.

Synaphobranchus (*Histiobranchus*) *bathybius*, Günther.

Synaphobranchus bathybius (part), Günther, 1877, Ann. Mag. Nat. Hist. (4) XX, p. 445 ; 1887, *t.c.*, p. 254, pl. lxii, fig. b.

Occurrence :

St. 120, Zanzibar area, AT, 2926 m. ; 1 (258 mm.).

Distribution.—Indo-Pacific.

Remarks.—If *S. infernalis* (Gill) should prove to be identical with *S. bathybius*, this species occurs also in the Atlantic.

Family Notacanthidæ.

Notacanthus indicus, Lloyd.

Notocanthus indicus, Lloyd, 1909, Mem. Ind. Mus. II, p. 153 ; Illust. Zool. " Investigator ", pl. xlv, fig. 8.

Occurrence :

St. 54, S. Arabian Coast, AT, 1046 m. ; 2 (210, 230 mm.).

Distribution.—Arabian Sea.

Remarks.—The smaller specimen has 11 dorsal and 15 anal spines, the larger specimen 10 dorsal and 14 anal spines. In other respects they agree closely with the original description.

The holotype (Ind. Mus. Reg. No. $\frac{1019}{1}$) was 200 mm. in total length, and was captured in the Arabian Sea at a depth of 960 metres.

Family Halosauridæ.

Halosaurus parvipennis, Alcock.

Halosaurus parvipennis, Alcock, 1892, Ann. Mag. Nat. Hist. (6) X, p. 362 ; 1900, Illustr. Zool. " Investigator ", pl. xxxiii, fig. 1 ; 1899, Cat. Ind. Deep-sea Fish. p. 186.

Occurrence :

St. 33, Gulf of Aden, AT, 1295 m. ; 1 (340 mm.).

St. 143, Maldive area, AT, 797 m. ; 1 (260 mm.).

Distribution.—Arabian Sea.

Remarks.—This species will probably prove to be identical with *H. carinicauda* (Alcock), which has been recorded from the Andaman and Bali Seas.

Aldrovandia affinis (Günther).

For synonymy and description see Weber and Beaufort, 1922, Fish. Indo-Austral. Arch. IV, p. 5 ; Barnard, 1925, Ann. S. Afr. Mus. XXI, p. 167.

Occurrence :

St. 118, Zanzibar area, AT, 1789 m. ; 1 (310 mm.).

St. 158, Maldive area, AT, 786–1170 m. ; 1 (320 mm.).

Distribution.—Indian Ocean ; near Japan.

Family Exocœtidæ.

Parexocœtus brachypterus (Richardson).

See Weber and Beaufort, 1922, Fish. Indo-Austral. Arch. IV, p. 174, fig. 60.

Occurrence :

Red Sea. No other data ; 2 (95, 135 mm.).

Distribution.—Cosmopolitan in warm seas.

Exocœtus volitans, Linnæus.

Occurrence :

Central part of Arabian Sea—Flew on board in the morning ; 1 (170 mm.).

Distribution.—Cosmopolitan in tropical and temperate seas.

Remarks.—There is a crustacean parasite attached to the right pectoral fin.

Hirundichthys affinis (Günther).

See Bruun, 1935, " Dana " Report, No. 6, p. 67, pl. vi, figs. 1, 3.

Occurrence :

Central part of Arabian Sea—flew on board in the morning ; 1 (175 mm.).

Distribution.—Atlantic, Indo-Pacific.

Family Fistulariidæ.

Fistularia villosa, Klunzinger.

See Weber and Beaufort, 1922, Fish. Indo-Austral. Arch. IV, p. 12, fig. 5.

Occurrence :

St. 146, Maldive area, OT, 37 m. ; 3 (320–325 mm.—without caudal filament).

Distribution.—East Africa, through the Indian Ocean and Archipelago, to the Pacific.

Family Syngnathidæ.

Halicampus koilomatodon (Bleeker).

See Weber and Beaufort, 1922, *t.c.*, p. 103.

Occurrence :

St. 37, Gulf of Aden, OT, 18–22 m. ; 1 (108 mm.).

Distribution.—From the Gulf of Aden, through the Indian Ocean and Archipelago, to Australia and Japan.

Remarks.—Previously this species does not appear to have been reported farther westwards than Ceylon.

Family Macruridæ.

Bathygadus furvescens, Alcock.

Bathygadus furvescens, Alcock, 1894, J. Asiat. Soc. Bengal, LXIII (2), p. 128 ; 1895, Illust. Zool. " Investigator ", pl. xvi, fig. 1 ; 1899, Cat. Indian Deep-sea Fish. p. 121.
Bathygadus melanobranchus (*non* Vaillant), Brauer, 1906, " Valdivia " Tiefsee-Fische, p. 272.

Occurrence :

St. 33, Gulf of Aden, AT, 1295 m. ; 1 (293 mm.).
St. 34, Gulf of Aden, AT, 1022 m. ; 8 (105–325 mm.).
St. 143, Maldive area, AT, 797 m. ; 3 (158–360 mm.).
St. 193, Gulf of Aden, AT, 1061–1080 m. ; 5 (80–280 mm.).

Distribution.—Indian Ocean.

Description.—The orbit is about as long as the snout, equal to or greater than the interorbital width, and 4 to 5 in length of head. No barbel. 19 to 21 gill-rakers on lower part of anterior arch. First dorsal, pectoral and pelvic fins each with a filamentous ray, which, when complete, is generally at least as long as the head or nearly so. The pelvic fins each have 8 rays. All the fins blackish ; branchial cavities wholly black.

Remarks.—This species has been described by Gilbert and Hubbs, Weber and Beaufort and others as lacking the filamentous prolongations of the fins. These are present, however, in all the specimens listed above, although frequently broken to a greater or lesser extent. They are also well developed in a specimen of 400 mm. from the Laccadive Sea, received from the Indian Museum, which formed part of the material studied by Alcock.

This species appears to be very closely related to *B. melanobranchus* from the Atlantic, but may be distinguished by the smaller eye.

Bathygadus spongiceps, Gilbert & Hubbs ?

Bathygadus spongiceps, Gilbert & Hubbs, 1920, Bull. U.S. Nat. Mus. I (100), p. 381, fig. 1 ; Weber and Beaufort, 1929, Fish. Indo-Austral. Arch. V, p. 17.

Occurrence :

St. 119, Zanzibar area, AT, 1207–1463 m. ; 1 (270 mm.).

Distribution.—Indian Ocean and Archipelago, China Sea, Philippines.

Remarks.—This specimen is in very poor condition, but may belong to this species.

Gadomus multifilis (Günther).

For synonymy and description see Weber and Beaufort, 1929, *t.c.*, p. 23.

Occurrence :

St. 143, Maldive area, AT, 797 m. ; 5 (170–225 mm.).

St. 158, Maldive area, AT, 786–1170 m. ; 1 (225 mm.).

The following smaller examples may belong here :

St. 108, Zanzibar area, AT, 786 m. ; 1 (100 + mm.).

St. 184, Gulf of Aden, AT, 1270 m. ; 1 (68 mm.).

Distribution.—Indian Ocean and Archipelago.

Macrouroides inflaticeps, Smith & Radcliffe.

Macrouroides inflaticeps, Smith & Radcliffe, 1912, in Radcliffe, Proc. U.S. Nat. Mus. XLIII, p. 139, pl. xxxi, fig. 2.

Occurrence :

St. 156, Maldive area, AT, ? m. ; 1 (*c.* 360 mm.).

Distribution.—Near Maldives, Philippines.

Remarks.—This very remarkable species was known previously only from the unique holotype (U.S.N.M. No. 72950), 147 mm. in length, from near Batan Island, Lagonoy Gulf, Luzon, at a depth of 765 metres. Smith and Radcliffe originally erected a special family, Macrouroididæ, for its reception, but the discovery by Gilbert and Hubbs (1916, 'Proc. U.S. Nat. Mus.' LI, p. 156, pl. viii, fig. 2) of a related form, *Squalogadus modificatus*, with the pelvic fins present, makes it advisable to reduce this to the rank of a subfamily, lying between the Bathygadinæ and the Coryphænoidinæ. *Squalogadus* differs from *Macrouroides* in the presence of pelvic fins ; in the wide pectorals, each with 25 rays ; in the longer gill-rakers ; in the presence of pseudobranchial filaments ; and in the more posterior mouth, which is wholly behind the eye. The type (U.S.N.M. No. 76864), 327 mm. in length, was captured in Bungo Channel, off Kyushu, Japan, at a depth of 1350 metres.

Unfortunately, the head of the specimen obtained by the " Mabahiss " is very badly damaged, and tends to fall to pieces if handled. Consequently, it has been impossible to add much to the original description of Smith and Radcliffe. The scales on the head are each armed with a number of small, vertically projecting spinules, but on the body the number of spinules on each scale appears to decrease as we pass from the head towards the tail. There are about 22 gill-rakers on the lower part of the anterior arch.

Genus *Odontomacrurus*, nov.

Head of moderate size, soft and cavernous, without prominent ridges; snout not produced, the mouth being terminal, with the lower jaw shorter than the upper. Eye small. No barbel. Teeth uniserial in both jaws, all strong, spaced, curved and canine-like, those of the lower jaw confined to the anterior part of the jaw, stronger and wider apart than those of the upper jaw, which increase in size anteriorly; no teeth on the palate. Six branchiostegal rays; gill-openings wide; gill-membranes broadly united anteriorly, narrowly joined to the isthmus and with a posterior free fold; a fold of membrane attached to the first gill-arch, restricting the slit in front of the gill; no pseudobranchiæ; gill-rakers on lower part of anterior arch represented by small spines. Scales small, the exposed parts covered with small, slender spinules; a rounded, smooth, naked patch above pectoral fin. Lateral line nearly straight. Spine of first dorsal fin slender, smooth, its basal part covered with scales; second dorsal much lower than the anal. Pectoral situated below the dorsal. Pelvics 7-rayed.

Genotype: *Odontomacrurus murrayi*, sp. n.

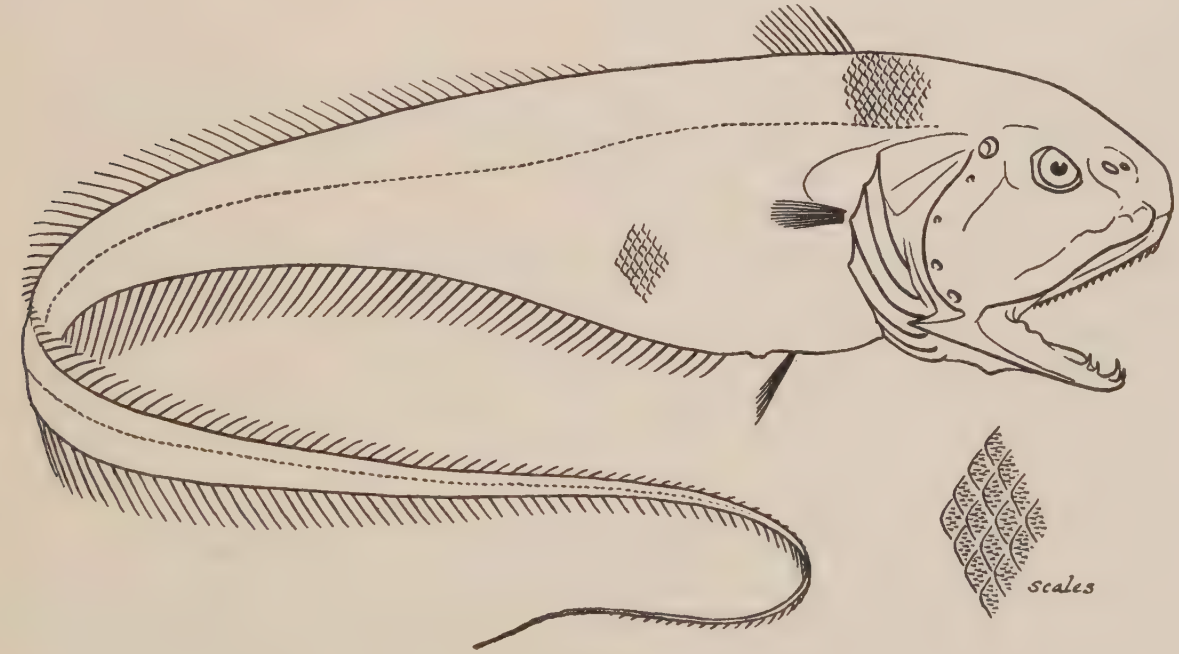
Odontomacrurus murrayi, sp. n.

Occurrence:

St. 131D, Arabian Sea, N 200, 2500–0 m.; 1 (*c.* 550 mm.). Holotype.

Distribution.—Arabian Sea.

Description.—Length of head about 8 in total length of fish. Snout about twice as long as eye, diameter of which is 7 in length of head and $2\frac{1}{2}$ times in interorbital width.



Text-fig. 18.—*Odontomacrurus murrayi*. Holotype. × $\frac{2}{3}$.

Maxillary extending to beyond eye. A small, scaleless depression above upper end of edge of præoperculum. First dorsal II 8; distance from second nearly $\frac{1}{2}$ length of head.

Pectoral with 10 rays. About 10 series of scales between lateral line and dorsal fin. Uniformly greyish-brown; patches above pectoral fins and membranes joining opercules to head black; gill-membranes and parts of inner walls of branchial cavities black.

Remarks.—This specimen is in a poor state of preservation, and, like that of *Macrouroides*, is liable to fall to pieces when handled. *Odontomacrurus* is apparently most nearly related to *Cynomacrurus*, which it resembles in the large terminal mouth, with lateral cleft, the absence of a barbel, the small eye, the slender, smooth dorsal spine, and the 7-rayed pelvic fins. It differs from that genus in the form of the scales and the dentition.

A note made upon the fresh specimen states that " the general ground-colour of the body and tail is a uniform black, except for a greyish ' efflorescence ' over the scales on the top of the head and anterior region of the body. The snout is a deep brown, and this same colour extends along the maxilla. Between the maxilla and cheeks the skin at the bottom of the groove is a pale yellowish-white, and so is the upper margin of the mandible in the basal portion. There is a triangular black patch behind the preoperculum, occupying the whole groove between it and the operculum, and at the top of this groove, but separated from it by a short interval, is a pale oval patch (? luminous organ). On the left side the branchiostegal membrane is a deep black throughout, but on the right side the posterior and upper third is a creamy white. On the posterior margin of the gill-cleft there are two creamy patches, the lower one being situated close to the isthmus. The axilla is also occupied by a leaf-shaped black patch".

I have great pleasure in naming this interesting species after Mr. J. C. Murray, the President and Treasurer of the " John Murray " Expedition.

Cœlorhynchus (*Quincuncia*) *argentatus*, Smith & Radcliffe.

Cœlorhynchus argentatus, Smith & Radcliffe, 1912, in Radcliffe, Proc. U.S. Nat. Mus. XLIII, p. 137, pl. xxxi, fig. 1; Gilbert and Hubbs, 1920, Bull. U.S. Nat. Mus. 1 (100), p. 433; Barnard, 1925, Ann. S. Afr. Mus. XXI, p. 339; Weber and Beaufort, 1929, Fish. Indo-Austral. Arch. V, p. 40, fig. 9.
Cœlorhynchus acus, Weber, 1913, " Siboga "-Exped., Fishes, p. 160. pl. i, fig. 4.

Occurrence:

St. 110, Zanzibar area, OT, 347–384 m.; 1 (190 mm.).

Distribution.—Indian Ocean and Archipelago, Philippines.

Remarks.—This species was not previously represented in the British Museum collection. It is possible that the form from the coast of Africa may prove to be distinct from that of the eastern Indian Ocean.

Cœlorhynchus (*Oxymacrurus*) *quadricristatus* (Wood-Mason & Alcock).

Macrurus quadricristatus, Wood-Mason & Alcock, 1891, Ann. Mag. Nat. Hist. (6) VIII, p. 119; 1892, Illust. Zool. " Investigator ", pl. iii, fig. 1; Alcock, 1894, J. Asiat. Soc. Bengal, LXIII (2), p. 126; 1899, Cat. Indian Deep-sea Fish. p. 106.

Occurrence:

St. 145, Maldive area, AT, 494 m.; 4 (107–190 + mm.).

Distribution.—Near Maldives, Andaman Sea.

Coryphænoides lophotes (Alcock) ?

Macrurus lophotes, Alcock, 1889, Ann. Mag. Nat. Hist., (6) IV, p. 395 ; 1892, Illustr. Zool. " Investigator ", pl. iii, fig. 2 ; 1899, Cat. Indian Deep-sea Fish., p. 116.

Occurrence :

St. 193, Gulf of Aden, AT, 1061–1080 m. ; 1 (110 mm.).

Distribution.—Gulf of Aden (?) ; Bay of Bengal.

Remarks.—It is with some hesitation that I have referred this small specimen to Alcock's species, known only from two fragmentary specimens, each about 130 mm. long, from the Bay of Bengal " Swatch of No-ground ", at a depth of 538 to 760 metres (Ind. Mus. Reg. Nos. 11670–1).

Hymenocephalus heterolepis (Alcock).

Macrurus (*Mystaconurus*) *heterolepis*, Alcock, 1889, Ann. Mag. Nat. Hist. (6) IV, p. 396 ; 1891, *ibid.* (6) VIII, p. 123 ; 1892, Illust. Zool. " Investigator ", pl. iii, fig. 3.

Macrurus (*Mystaconurus*) *cavernosus*, Alcock, 1899, Cat. Indian Deep-sea Fish. p. 117 ; Brauer, 1906, " Valdivia " Tiefsee-Fische, p. 269.

Occurrence :

St. 35, Gulf of Aden, OT, 457–549 m. ; 16 (110–150 mm.).

St. 109, Zanzibar area, AT, 640 m. ; 2 (143, 145 mm.).

St. 115, Zanzibar area, OT, 640–658 m. ; 30 (60 + –150 mm.).

St. 145, Maldive area, AT, 494 m. ; 22 (70–115 mm. + several fragments).

St. 154, Maldive area, AT, 457 m. ; several (fragmentary).

Distribution.—Indian Ocean.

Remarks.—Alcock, who had several examples from the Gulf of Manár and the Andaman Sea, concluded, after comparison of actual specimens, that his species was synonymous with *H. cavernosus* (Goode & Bean), from the Gulf of Mexico, but, according to Gilbert and Hubbs, the Atlantic species, like *H. italicus*, Giglioli, from the Mediterranean, has a larger orbit. For the present the three species may be maintained as distinct.

Malacocephalus lævis (Lowe).

For synonymy and description see Weber and Beaufort, 1929, *t.c.*, p. 62, fig. 13.

Occurrence :

St. 115, Zanzibar area, OT, 640–658 m. ; 9 (340–470 mm.).

St. 145, Maldive area, AT, 494 m. ; 3 (270–330 mm.).

Distribution.—Atlantic and Indian Oceans.

Remarks.—After careful comparison of the above specimens with others from the Atlantic, I am unable to detect any constant differences that might be regarded as of specific importance. On the whole the eye appears a little larger in Atlantic specimens, but this is a variable character, and dependent to a considerable extent upon the state of preservation.

Ventrifossa petersonii (Alcock).

For synonymy and description see Weber and Beaufort, 1929, Fish. Indo-Austral. Arch. V, p. 67.

Occurrence :

St. 109, Zanzibar area, AT, 786 m. ; 1 (180 mm.).
St. 115, Zanzibar area, OT, 640–658 m. ; 1 (115+mm.).
St. 122, Zanzibar area, OT, 732 m. ; 1 (415 mm.).
St. 145, Maldive area, AT, 494 m. ; 2 (108, 135 mm.).

Distribution.—Indian Ocean and Archipelago.

Lionurus polylepis (Alcock).

Macrurus polylepis, Alcock, 1889, Ann. Mag. Nat. Hist. (6) IV, p. 395 ; 1899, Cat. Indian Deep-sea Fish. p. 112 ; 1900, Illust. Zool. " Investigator ", pl. xxix, fig. 4.

Occurrence :

St. 109, Zanzibar area, AT, 786 m. ; 1 (123 mm.).
St. 115, Zanzibar area, OT, 640–658 m. ; 4 (115–143 mm.).

Distribution.—Near Zanzibar, Bay of Bengal.

Remarks.—This species is not represented in the British Museum collection, but the above specimens agree pretty well with Alcock's rather brief description. There is a distinct black spot at the tip of the first dorsal fin not shown in his figure, but in his specimens this fin was apparently broken. There are two examples in the Indian Museum (Reg. Nos. 11678, 11724), the larger just over 155 mm. in length, both from the Bay of Bengal, at depths of 362 and 510 metres.

Matœocephalus microstomus (Regan).

Macrurus microstomus, Regan, 1908, Trans. Linn. Soc. Lond., Zool. XII, p. 221, pl. xxiii, fig. 2.

Occurrence :

St. 115, Zanzibar area, OT, 640–658 m. ; 1 (130 mm.).
St. 143, Maldive area, AT, 797 m. ; 2 (200+, 235 mm.).

Distribution.—Indian Ocean.

Remarks.—The type of the species, 180 mm. in total length, is from the Saya de Malha Bank, at a depth of 560 to 940 metres. The specimen from the Bay of Bengal, recorded by Lloyd (1909, 'Mem. Ind. Mus.' II, p. 159) as *Macrurus* (*Cœlorhynchus*) *acipenserinus* (Gilbert and Cramer), may, perhaps, have belonged to this species.

Family Gadidæ.

Bregmaceros maclellandi, Thompson.

Occurrence :

St. 16, Gulf of Aden, AT, 186 m. ; 2 (36, 42 mm.).
St. 48, S. Arabian Coast, AT, 201–274 m. ; 2 (68, 75 mm.).
St. 61a–b, Arabian Sea, N 100, 500–0 m. ; 33 (14–44 mm.) . N 100, 1000–0 m. ; 14 (23–44 mm.) . N 100, 1500–0 m. ; 13 (23–47 mm.) . N 200, 2000–0 m. ; 3 (35–50 mm.).

St. 61C–D, Arabian Sea, N 100, 1000–0 m. ; 6 (18–36 mm.). N 100, 1500–0 m. ; 13 (23–47 mm.). N 200, 2000–0 m. ; 2 (38, 42 mm.).
St. 76, Gulf of Oman, N 100, 600 m. ; 11 (25–44 mm.).
St. 79, S. Arabian Coast, SD 4, 95–102 m. ; 1 (51 mm.).
St. 87, Arabian Sea, AT, 549–640 m. ; 1 (39 mm.).

DISTRIBUTION.—Atlantic, Indian and Pacific Oceans.

Physiculus peregrinus (Günther).

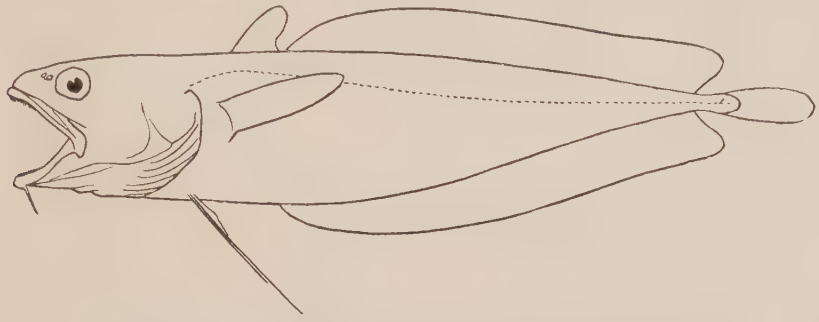
Pseudophycis peregrinus, Günther, 1871, Proc. Zool. Soc. Lond. p. 669.
Physiculus peregrinus, Günther, 1887, Deep-sea Fish. "Challenger", p. 88 ; Norman, 1937, "Discovery" Reports, XVI, p. 57.

OCCURRENCE :

St. 105, Zanzibar area, AT, 238–293 m. ; 5 (80–217 mm.).

DISTRIBUTION.—Near Zanzibar, Philippines.

DESCRIPTION.—Depth of body $4\frac{1}{2}$ to a little more than 5 in the length, length of head $3\frac{4}{5}$ to $4\frac{1}{4}$. Snout as long as or rather longer than eye, diameter of which is 4 (young) to 5 in length of head, and $1\frac{1}{5}$ to $1\frac{1}{2}$ in interorbital width. Maxillary extending to beyond



TEXT-FIG. 19.—*Physiculus peregrinus*. St. 105. × $\frac{1}{2}$.

middle of eye ; lower jaw a little shorter than upper ; barbel $\frac{2}{3}$ to $\frac{5}{6}$ diameter of eye ; teeth in villiform bands, those of the outer series scarcely or not much larger than the remainder. 7 to 9 gill-rakers on lower part of anterior arch. Length of pectoral about $1\frac{1}{2}$ in that of head. Pelvics 5-rayed* ; longest ray nearly as long as head, extending beyond origin of anal.

REMARKS.—The type of the species, 135 mm. in total length, is the only other specimen known, and was one of several sent by Dr. A. B. Meyer from Manado. *Physiculus argryopastus*, Alcock, from the Bay of Bengal and the Gulf of Manár, is very closely related, but appears to have a narrower interorbital region and smaller teeth in the jaws.

Physiculus roseus, Alcock.

Physiculus roseus, Alcock, 1891, Ann. Mag. Nat. Hist. (6) VIII, p. 28 ; 1894, Illust. Zool. "Investigator", pl. xi, fig. 2 ; 1899, Cat. Indian Deep-sea Fish. p. 76 ; Weber and Beaufort, 1929, *t.c.*, p. 8.

OCCURRENCE :

St. 35, Gulf of Aden, OT, 457–549 m. ; 10 (125–230 mm.).

DISTRIBUTION.—Indian Ocean and Archipelago.

* Günther gives the number of rays in the pelvic fin as 3 in his original description, but, although the type is in a poor state of preservation, I have been able to count 5 on one side.

Physiculus edelmanni, Brauer.

Physiculus edelmanni, Brauer, 1906, " Valdivia " Tiefsee-Fische, p. 274, pl. xii, fig. 6.

Occurrence :

St. 115, Zanzibar area, OT, 640–658 m. ; 1 (195 mm.).

Distribution.—Deep water off the coast of East Africa.

Remarks.—This specimen is in poor condition, but is clearly referable to Brauer's species, which differs from all other members of the genus in having no mental barbel. In other respects it is a typical *Physiculus*.

Family Diretmidæ.

Diretmus argenteus, Johnson.

Occurrence :

St. 131, Arabian Sea, N 200, 600–0 m. ; 1 (34 mm.).

Distribution.—Atlantic, Indo-Pacific.

Family Trachichthyidæ.

Genus *Hoplostethus*, Cuvier & Valenciennes.

Hoplostethus, Cuvier & Valenciennes, 1829, Hist. Nat. Poiss. IV, p. 469.
Leiogaster, Weber, 1913, " Siboga "-Exped., Fische, p. 179.
? *Korsogaster*, Parr, 1933, Bull. Bingham Ocean. Coll. III (6), p. 9.

The only character of importance separating *Leiogaster* from *Hoplostethus* was said to be the absence of abdominal scutes. These are, however, developed to a certain extent in the adult fish, and, since in the degree to which scutes are developed *Leiogaster melanopus*, *Hoplostethus atlanticus*, *H. gilchristi* and *H. mediterraneus* form a more or less graded series, it would seem convenient to unite the two genera. As the scutes are fewer, stronger and more clearly defined in *mediterraneus* than in the other species, *Leiogaster* may be maintained as a subgenus to include *melanopus*, *atlanticus* and *gilchristi*. *Korsogaster nanus* was based upon a single specimen, only 18 mm. in length without the caudal fin, and will probably prove to be the young of some species of *Hoplostethus*. There is a slightly larger specimen (20 mm.) in the British Museum collection from off East London, 750 to 845 metres, which I believe to be a young example of *H. gilchristi*. There is an opening behind the fourth gill-arch as in *Korsogaster* ; scales are absent, but above the lateral line they are represented by minute, slender, simple spines.

Hoplostethus (*Hoplostethus*) *mediterraneus*, Cuvier & Valenciennes.

For synonymy and description see Weber and Beaufort, 1929, Fish. Indo-Austral. Arch. V, p. 217, fig. 59.

Occurrence :

St. 35, Gulf of Aden, OT, 457–549 m. ; 5 (90–120 mm.).

St. 115, Zanzibar area, OT, 640–658 m. ; 1 (180 mm.).

Distribution.—Mediterranean, Atlantic, Indo-Pacific.

Hoplostethus (*Leiogaster*) *melanopus* (Weber).

Leiogaster melanopus, Weber, 1913, " Siboga "-Exped., Fische, p. 180 ; Weber and Beaufort, 1929, Fish. Indo-Austral. Arch. V, p. 218, fig. 60.

Occurrence :

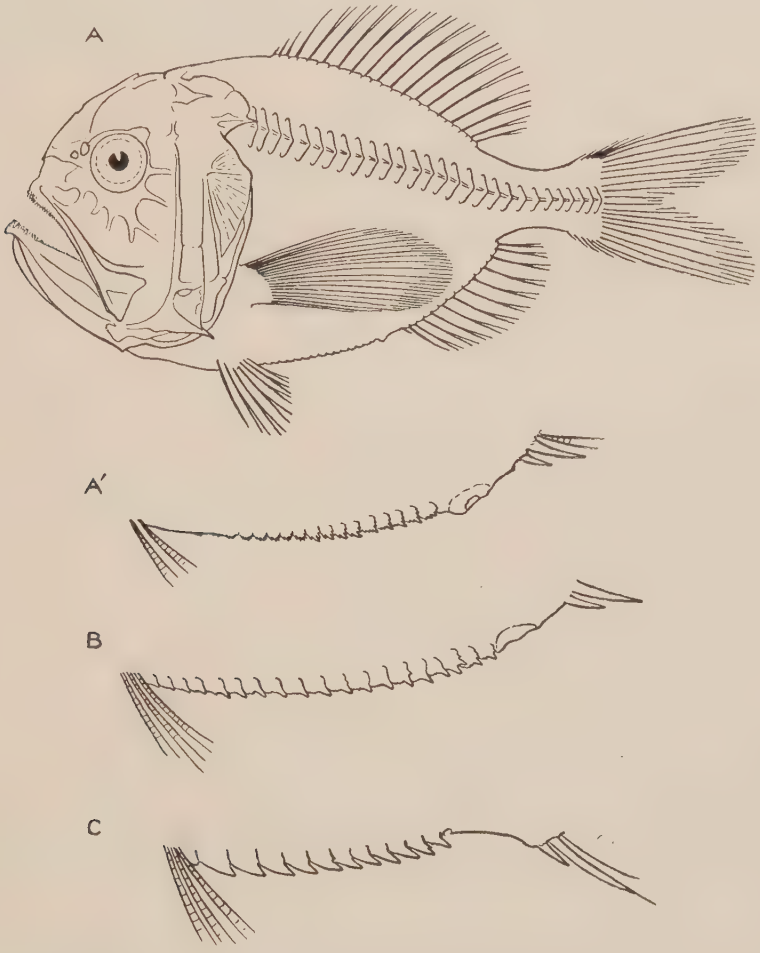
St. 108, Zanzibar area, AT, 786 m. ; 1 (83 mm.).

St. 124, Zanzibar area, MT, 914 m. ; 1 (240 mm.).

St. 143, Maldive area, AT, 797 m. ; 2 (110, 195 mm.).

Distribution.—Indian Ocean and Archipelago ; in deep water.

Description.—Depth of body $1\frac{5}{6}$ to $2\frac{1}{5}$ in the length, length of head $2\frac{1}{3}$ to $2\frac{2}{3}$. Snout as long as or longer than eye, diameter of which is $3\frac{3}{4}$ to a little more than 4 in length of head,



Text-fig. 20.—A. *Hoplostethus* (*Leiogaster*) *melanopus*. St. 143. × $\frac{1}{2}$. A'. Abdominal scutes of a specimen of the same species, 215 mm. in total length. × 1. B. Abdominal scutes of a specimen of *H. gilchristi*, 270 mm. in total length. × 1. C. Abdominal scutes of a specimen of *H. mediterraneus*, 240 mm. in total length. × 1.

and about $1\frac{1}{4}$ in the interorbital width. Posterior border of maxillary a little emarginate. A small patch of deciduous vomerine teeth sometimes present in young examples. A strong spine at the angle of the præoperculum. Young without any abdominal scutes, but in larger specimens there is a row of indistinct, feeble, spinous scutes between the

pelvic fins and the vent. Dorsal IV 15–16. Anal II or III 10–11. Pectoral with 18 to 20 rays, nearly as long as head, extending to above middle of anal fin or beyond. Pelvic I 6, not reaching vent. Brownish ; the head paler ; dorsal and anal fins dark brown ; caudal pale ; pectorals and pelvics black.

Remarks.—This species may be distinguished from *H. atlanticus*, Collett, and *H. gilchristi*, Smith, by the form of the abdominal scutes, the shape of the posterior border of the maxillary, the fewer dorsal spines, the longer pectoral fins, and by the black pectorals and pelvics. In addition to the specimens mentioned above, this description includes a larger example, 215 mm. in length, from off South Africa, 402 to ? 548 metres.* It is possible that *H. gilchristi* will prove to be identical with *H. atlanticus*, but as I have been able to examine only one very large example of the latter species (about 550 mm.), from off the south-west of Ireland, it is difficult to decide how far the apparent differences are due to the size of the specimen. *H. melanopterus*, Fowler, from the Philippines, is perhaps identical with *H. melanopus*.

Family Melamphaidæ.

Melamphæs robustus, Günther.

See Norman, 1929, Ann. Mag. Nat. Hist. (10) IV, p. 160 ; Parr, 1933, Bull. Bingham Ocean. Coll. III (6), p. 19.

Occurrence :

St. 172, Arabian Sea, N 200, 2091–0 m. ; 1 (55 mm.).

Distribution.—Atlantic ; Indo-Pacific.

Remarks.—As suggested by Parr, it seems probable that *M. nigrescens*, Brauer, is synonymous with *M. robustus*.

Melamphæs megalops, Lütken.

See Norman, 1929, *t.c.*, p. 161.

Occurrence :

St. 172, Arabian Sea, N 100, 850–0 m. ; 2 (30, 37 mm.).

Distribution.—Atlantic and Indian Oceans.

Remarks.—These specimens are in poor condition, but compare very well on the whole with specimens of *M. megalops* from the Atlantic.

Melamphæs mizolepis, Günther.

See Norman, 1929, *t.c.*, p. 168 ; Parr, 1931, Bull. Bingham Ocean. Coll., II (4), p. 44.

Occurrence :

St. 133, Arabian Sea, MT, 3385 m. ; 1 (48 mm.).

Distribution.—Atlantic, Indo-Pacific.

* This formed one of a series of 9 specimens, 210 to 430 mm. in total length, recorded by me as *H. atlanticus* (Norman, 1935, " Discovery " Reports, XII, p. 51). The remainder, which were captured at St. J (34° 8′ S., 17° 33′ E.), should presumably be referred to *H. gilchristi*, Smith.

Family Zeidæ.

Zen scutatus (Gilchrist & von Bonde).

Paracyttopsis scutatus, Gilchrist & von Bonde, 1924, Rep. Fish. Mar. Biol. Surv. III (1922), Spec. Rep. VII, p. 18, pl. v ; Barnard, 1925, Ann. S. Afr. Mus. XXI, p. 378.

Occurrence :

St. 145, Maldive area, AT, 494 m. ; 1 (155 mm.).

Distribution.—Coast of Natal, near Maldives ; in deep water.

Remarks.—This specimen agrees very well with the description given by Gilchrist and von Bonde, which was based upon a single specimen, 125 mm. in length, from off the coast of Natal, 425 metres. *Z. itea* (Jordan & Fowler), from Japan, appears to have a somewhat smaller eye, and *Z. cypho*, Fowler, from the Philippines, also has a smaller eye and a dark spot on the lateral line ; the three species, however, seem to be very closely related.

Family Serranidæ.

Genus *Ostracoberyx*, Fowler.

Ostracoberyx, Fowler, 1934, Proc. Acad. N.S. Philad., LXXXV (1933), p. 353.

Fowler has erected the family Ostracoberycidæ for the reception of this genus, and places it among the Berycoid fishes. " This interesting family," he writes, " apparently related to the Trachichthyidæ in general appearance of the head, normal scales, projecting mandible, position of the paired fins and the presence of three anal spines. It differs, however, markedly in its ossified finely-striated surface bones of the head, more dorsal spines, rounded caudal fin and divided dorsals."

The pelvic fins, each of a spine and 5 soft rays, and the presence of 17 principal rays in the caudal fin, 15 of which are branched, suggest that this fish is not likely to be a Berycoid, and the examination of a skeleton prepared from one of the specimens obtained by the " Mabahiss " confirms this suggestion, as there is no trace of an orbitosphenoid in the skull. Other osteological characters which may be noted are the apparent absence of a supramaxillary, the well-marked subocular shelf, and the two post-cleithra on each side. The anterior ribs are sessile, the posterior inserted on parapophyses. There are 25 (10 + 15) vertebræ. In all its characters this genus falls within the suborder Percoidea of the Order Percomorphi, and clearly belongs to the division Perciformes of Regan's classification.* I see no reason for maintaining the family Ostracoberycidæ, as the genus fits well into the definition of the family Serranidæ. In spite of its very different external appearance, *Ostracoberyx* seems to be related to the Japanese *Niphon*, and the osteological characters of the two genera are very similar. It may be noted that *Niphon* has a very strong spine at the angle of the præoperculum. In addition to the more robust form and strongly armoured head, *Ostracoberyx* differs from *Niphon* in the larger cycloid scales, the denticulated lower and smooth hinder margin of the præoperculum, the absence of spines on the operculum, the fewer spines in the dorsal fin and the absence of a spine in front of the fin, the rounded caudal fin, the fewer rays in the pectoral fin, and the lower number of vertebræ.

* 1913, Ann. Mag. Nat. Hist. (8) XII, p. 111.

Ostracoberyx dorygenys, Fowler.

Ostracoberyx dorygenys, Fowler, 1934, *t.c.*, p. 353, fig. 105.

Occurrence :

St. 109, Zanzibar area, AT, 640 m. ; 1 (230 mm.).

St. 145, Maldive area, AT, 494 m. ; 3 (125–150 mm.). One of these specimens prepared as a dry skeleton.

Distribution.—Near Zanzibar, Maldives, Philippines ; in deep water.

Remarks.—I have nothing to add to the original description given by Fowler. The examples mentioned above have 7 branchiostegal rays, but otherwise seem to agree very closely with the type.

Epinephelus præoperculatis, Boulenger.

Occurrence :

St. 75, Gulf of Oman, OT, 201 m. ; 3 (145–355 mm.).

Distribution.—Coast of Natal, Persian Gulf.

Epinephelus sp.

Occurrence :

St. 37, Gulf of Aden, OT, 18–22 m. ; 1 (75 mm.).

Remarks.—I am unable to identify this young example with certainty. It is not unlike *E. chlorostigma*, Cuvier & Valenciennes, a species widely distributed in the Indo-Pacific.

Chelidoperca investigatoris (Alcock).

Occurrence :

St. 43, S. Arabian Coast, OT, 83–100 m. ; 4 (73–110 mm.).

Distribution.—South Arabian Coast, Madras coast.

Anthias squamipinnis (Peters).

Occurrence :

St. 10, Red Sea, OT, 55 m. ; 6 (85–110 mm.).

Distribution.—East Africa, Red Sea, East Indies, Philippines.

Anthias cooperi, Regan.

Occurrence :

St. 27, Gulf of Aden, OT, 37–91 m. ; 2 (110, 111 mm.).

Distribution.—Gulf of Aden, Kurrachee, Maldives, Cargados Carajos.

Acropoma japonicum, Günther.

Occurrence :

St. 75, Gulf of Oman, OT, 201 m. ; 10 (93–160 mm.).

Distribution.—Gulf of Oman, India, East Indies, Philippines, Japan.

Remarks.—These specimens agree closely with Lloyd's description and figure of *Synagrops splendens*, based upon a single specimen, 150 mm. in length, from the Gulf of

Oman (1909, 'Mem. Ind. Mus.' II, p. 159 ; Illust. Zool. " Investigator ", pl. xlvii, fig. 5), but comparison with specimens of *Acropoma japonicum* shows the two species to be identical. *A. cynodon*, Regan, from the coast of Natal, is very closely related, but appears to have a more slender body, smaller head, rather stronger anterior canines, and larger scales.

Family Priacanthidæ.

Priacanthus hamrur (Forskål).

Occurrence :

St. 27, Gulf of Aden, OT., 37–91m. ; 1 (88 mm.).

St. 89, Arabian Sea, OT, 135–183m. ; 1 (125 mm.).

Distribution.—East Africa and the Red Sea, through the Indian Ocean and Archipelago, to Japan and the Pacific.

Family Chilodipteridæ.

Apogon (*Apogonichthys*) *auritus*, Cuvier & Valenciennes.

Occurrence :

St. 146, Maldive area, OT, 37 m. ; 1 (41 mm.).

Distribution.—East Africa and the Red Sea, through the Indian Ocean and Archipelago, to Australia and the Pacific.

Apogon (*Apogonichthys*) *ellioti*, Day.

Occurrence :

St. 71, Gulf of Oman, OT, 106 m. ; 1 (59 mm.).

Distribution.—Indian Ocean and Archipelago to China, Japan and Queensland.

Apogon (*Apogon*) *monochrous*, Bleeker.

Occurrence :

St. 27, Gulf of Aden, OT, 37–91 m. ; 1 (102 mm.).

Distribution.—Red Sea, Natal, East Indies, Philippines, Polynesia.

Apogon (*Apogon*) *maximus*, Boulenger.

Occurrence :

St. 43, South Arabian Coast, OT, 83–100 m. ; 1 (110 mm.).

Distribution.—Coast of Arabia, Gulf of Oman.

Remarks.—The largest of the three types of this species from Muscat is about 255 mm. in total length. It seems to be quite distinct from *Apogon tæniatus* (=*A. bifasciatus*).

Apogon (*Apogon*) *quadrifasciatus*, Cuvier & Valenciennes.

Occurrence :

St. 37, Gulf of Aden, OT, 18–22 m. ; 1 (72 mm.).

Distribution.—East Africa, through the Indian Ocean and Archipelago, to Japan and Australia.

Oxyodon macrops, Brauer.

Oxyodon macrops, Brauer, 1906, "Valdivia" Tiefsee-Fische, p. 288, fig. 172; Weber and Beaufort, 1929, Fish. Indo-Austral. Arch. V, p. 351, fig. 81.

Occurrence:

St. 124, Zanzibar area, MT, 914 m.; 1 (192 mm.).

Distribution.—Near Zanzibar, near Sumatra; in deep water.

Remarks.—This species was known previously only from the two types, 172 and 212 mm. in length, from off the west coast of Sumatra at a depth of 903 metres.

Synagrops japonicus (Steindachner & Döderlein).

For description see Fowler and Bean, 1930, Bull. U.S. Nat. Mus. C (10), p. 136.

Occurrence:

St. 105, Zanzibar area, AT, 238–293 m.; 10 (73–102 mm.).

St. 106, Zanzibar area, AT, 183–194 m.; 24 (50–95 mm.).

St. 115, Zanzibar area, OT, 640–658 m.; 12 (170–190 mm.).

St. 145, Maldive area, AT, 494 m.; 1 (165 mm.).

Distribution.—East coast of Africa, Maldives, Philippines, Japan, Micronesia.

Remarks.—The synonymies given by Fowler and Bean for this and the succeeding species have been somewhat confused. *Synagrops natalensis*, Gilchrist, placed by these authors in the synonymy of *S. philippinensis*, appears to be identical with *S. japonicus*, whereas *S. argyrea* (Gilbert & Cramer), from Hawaii, and *S. malayanus*, Weber, from the East Indies, are in all probability identical with *S. philippinensis*.

Synagrops philippinensis (Günther).

For description see Fowler and Bean, 1930, *t.c.*, p. 138.

Occurrence:

St. 16, Gulf of Aden, AT, 186 m.; 19 (78–90 mm.).

St. 75, Gulf of Oman, OT, 201 m.; 4 (66–100 mm.).

St. 194, Gulf of Aden, AT, 220 m.; 3 (42–60 mm.).

Distribution.—Indian Ocean and Archipelago to the Pacific.

Remarks.—As recognized by Alcock himself, *Parascombrops pellucidus*, Alcock, from the Bay of Bengal, proves to be synonymous with this species.

Family Latilidæ.

Branchiostegus doliatus (Cuvier & Valenciennes).

Occurrence:

St. 106, Zanzibar area, AT, 183–194 m.; 1 (45 mm.).

Distribution.—Western Indian Ocean.

Family Bathyclupeidæ.

Bathyclupea hoskynii, Alcock.

Bathyclupea hoskynii, Alcock, 1891, Ann. Mag. Nat. Hist. (6) VIII, p. 131, fig. 4; 1899, Cat. Indian Deep-sea Fish. p. 40; 1900, Illust. Zool. "Investigator", pl. xxviii, fig. 2.

Occurrence:

St. 35, Gulf of Aden, OT, 457–549 m.; 15 (120–190 mm.).

Distribution.—Indian Ocean; in deep water.

Description.—Depth of body about equal to length of head, which is about 3 in that of fish (without caudal). Snout a little more than $\frac{1}{2}$ diameter of eye, which is rather more than twice the interorbital width and 3 in length of head. Mouth nearly vertical, the lower jaw strongly projecting; maxillary extending to below anterior part of eye. Lower edge of præoperculum finely serrated. 24 to 28 gill-rakers on lower part of anterior arch. Dorsal 9 or 10; origin about equidistant from middle of eye and base of caudal. Anal 32–36; origin a little nearer tip of lower jaw than base of caudal. Pectoral with 29 or 30 rays.

Bathyclupea malayana, Weber.

Bathyclupea malayana, Weber, 1913, Fische "Siboga"-Exped. p. 193, pl. iii, fig. 1; Weber and Beaufort, 1931, Fish. Indo-Austral. Arch. VI, p. 183, fig. 36.

Occurrence:

St. 115, Zanzibar area, OT, 640–658 m.; 1 (280 mm.).

Distribution.—Near Zanzibar, Flores Sea; in deep water.

Description.—Closely related to *B. hoskynii*, but depth of body nearly 4 in the length, length of head about 3. Snout $\frac{2}{3}$ diameter of eye, which is twice the interorbital width and $2\frac{2}{3}$ in length of head. Mouth more oblique, the maxillary scarcely extending beyond anterior margin of eye. Lower edge of præoperculum smooth. About 16 gill-rakers on lower part of anterior arch. Dorsal 9. Anal 27 or 28. Pectoral with 30 rays.

Remarks.—This species, which was not previously represented in the British Museum, may prove to be identical with *B. argentea*, Goode & Bean, from the Atlantic.

Family Carangidæ.

Naucrates ductor (Linnæus).

Occurrence:

St. ——, Arabian Sea (Dec. 23rd, 1933). Hand-net, surface; 1 (20 mm.). Associated with *Porpita*.

Distribution.—Cosmopolitan.

Family Coryphænidæ.

Coryphæna equisetis, Linnæus.

Occurrence:

St. 76, Gulf of Oman, N 200, 2500 m.; 1 (63 mm.).

Distribution.—Cosmopolitan.

Family Emmelichthyidæ.

Dipterygonotus leucogrammicus, Bleeker.

Occurrence :

St. 27, Gulf of Aden, OT, 37–91 m. ; 1 (83 mm.).

Distribution.—Gulf of Aden, Ceylon, Indo-Australian Archipelago, Philippines.

Family Nemipteridæ.

Nemipterus japonicus (Bloch).

Occurrence :

St. A, Red Sea, OT, 65–68 m. ; 7 (96–136 mm.—without filament).

Distribution.—East Africa and the Red Sea, through the Indian Ocean and Archipelago, to China and Japan.

Remarks.—Three of these specimens have a large crustacean parasite in the gill-chamber.

Parascolopsis townsendi, Boulenger.

Parascolopsis townsendi, Boulenger, 1901, Ann. Mag. Nat. Hist. (7) VII, p. 262, pl. vi.

Occurrence :

St. 71, Gulf of Oman, OT, 106 m. ; 1 (105 mm.).

St. 89, Arabian Sea, OT, 135–183 m. ; 7 (72–123 mm.).

St. 194, Gulf of Aden, AT, 220 m. ; 15 (110–155 mm.).

Distribution.—Gulf of Aden, Gulf of Oman, northern part of Arabian Sea.

Family Leiognathidæ.

Leiognathus insidiator (Bloch).

Occurrence :

St. 37, Gulf of Aden, OT, 18–22 m. ; 3 (65–85 mm.).

Distribution.—East Africa, through the Indian Ocean and Archipelago, to the Pacific.

Leiognathus bindus (Cuvier & Valenciennes).

Occurrence :

St. 37, Gulf of Aden, OT, 18–22 m. ; 22 (52–85 mm.).

Distribution.—Gulf of Aden ; seas of India, through the Indo-Australian Archipelago, to China.

Leiognathus lineolatus (Cuvier & Valenciennes).

Occurrence :

St. 37, Gulf of Aden, OT, 18–22 m. ; 10 (78–86 mm.).

Distribution.—East Africa and the Red Sea (?), through the Indian Ocean and Archipelago, to Australia and Japan.

Gazza minuta (Bloch).

Occurrence :

St. 37, Gulf of Aden, OT, 18–22 m. ; 3 (77–90 mm.).

Distribution.—East Africa and the Red Sea, through the Indian Ocean and Archipelago, to the Pacific.

Family Pomadasidæ.

Pomadasys stridens (Forskål).

Occurrence :

St. A, Red Sea, OT, 65–68 m. ; 1 (165 mm.).

Distribution.—Red Sea, Arabia, Persian Gulf, Zanzibar.

Family Mullidæ.

Parupeneus fraterculus (Cuvier & Valenciennes).

Occurrence :

St. 27, Gulf of Aden, OT, 37–91 m. ; 1 (140 mm.).

Distribution.—East Africa,through the Indian Ocean and Archipelago, to Japan and the Pacific.

Upeneus bensasi (Schlegel) ?

Occurrence :

St. A, Red Sea, OT, 65–68 m. ; 1 (112 mm.).

Distribution.—East Africa and the Red Sea, through the seas of India, to the Philippines, China and Japan.

Remarks.—This specimen is in poor condition.

Family Ephippidæ.

Platax orbicularis (Forskål).

Occurrence :

St. ——, Shore collection at Zukhair Islands, Red Sea ; 1 (140 mm.).

Distribution.—East Africa and the Red Sea, through the Indian Ocean and Archipelago, to the Pacific.

Family Chætodontidæ.

Chætodon jayakari, sp. n.

Occurrence :

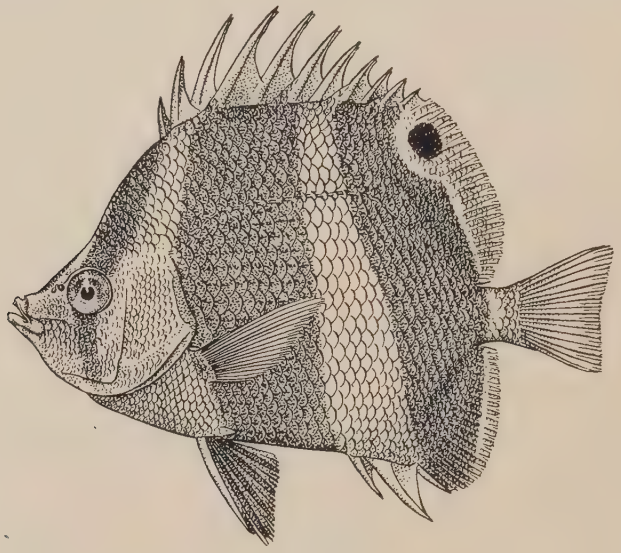
St. 24, Gulf of Aden, OT, 73–200 m. ; 2 (88, 104 mm.).

St. 43, South Arabian Coast, OT, 83–100 m. ; 1 (115 mm.).

Distribution.—Off the coasts of southern Arabia.

Description.—Body short, deep, compressed, the profile of the head distinctly concave. Depth of body about $1\frac{1}{3}$ in the length, length of head $2\frac{2}{5}$ to $2\frac{2}{3}$. Snout as long

as or a little longer than diameter of eye, which is $3\frac{1}{4}$ to nearly 4 in length of head ; interorbital width about $3\frac{1}{4}$. Teeth well developed. Scales evenly rounded behind, those on sides of body much larger anteriorly than posteriorly, arranged in more or less horizontal rows above and below the lateral line, at least anteriorly ; about 35 scales in a longitudinal series, 12 from origin of dorsal to lateral line ; lateral line with a blunt angle below posterior part of spinous dorsal, ending below last rays of soft dorsal. Dorsal XI 22–24 ; fourth spine $\frac{2}{3}$ to $\frac{3}{4}$, last spine rather more than $\frac{1}{2}$ length of head ; soft fin broadly rounded. Anal III 17–18. Pectoral about $\frac{4}{5}$ length of head. Caudal truncate. Greyish or yellowish-brown ; indistinct narrow dark lines running along the rows of scales ; a dark brown ocular band, narrower than the orbit, from origin of dorsal to lower margin of interoperculum ; a narrower median band from occipital region to tip of snout ; two rather broad greyish transverse bands on side, the first from the anterior part of the spinous dorsal



Text-fig. 21.—*Chætodon jayakari*. Holotype. × $\frac{1}{2}$.

to just behind the root of the pelvics, the second from the posterior part of the spinous and the anterior part of the soft dorsal downwards and a little backwards to the soft anal ; anterior part of soft dorsal with a dark, white-edged ocellus, which is rather larger than the eye ; pelvics blackish or dark brown; pectoral, caudal and hinder parts of soft dorsal and anal pale.

Remarks.—In addition to the examples obtained by the " John Murray " Expedition, the above description includes 4 specimens, 120 to 160 mm. in total length, from Muscat, Gulf of Oman, sent to the British Museum by Mr. A. S. G. Jayakar, and identified by Dr. G. A. Boulenger as *Chætodon modestus*. The largest of these has been selected as the holotype.

This species is very closely related to *C. modestus*, Schlegel (= *Coradion desmotes*, Jordan & Fowler), from China and Japan, but may be distinguished by the larger head, somewhat larger eye, fewer scales in a longitudinal series, rather shorter and less stout dorsal spines, and by the larger ocellus on the soft dorsal fin. In *C. modestus* the transverse bands on the body are each margined with darker.

Chætodon gardineri, sp. n.

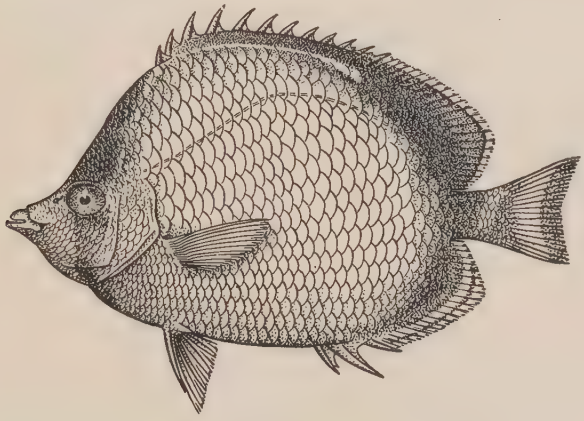
Chætodon selene (*non* Bleeker), Boulenger, 1887, Proc. Zool. Soc. Lond. p. 657.

Occurrence :

St. 27, Gulf of Aden, OT, 37–91 m. ; 1 (165 mm.).

Distribution.—Gulf of Aden, Gulf of Oman.

Description.—Very closely related to *C. selene*, but with larger scales and a different coloration. About 25 to 27 scales in a longitudinal series, 6 from first dorsal spine to origin of lateral line. Ground-colour yellowish, with faint narrow darker lines on lower part of body running along the oblique rows of scales ; no white spots on scales above ascending part of lateral line ; ocular band nearly as broad as the eye, with the white posterior border very faintly indicated, disappearing below eye, continued on lower part of cheek, united below with that of opposite side to form a blotch on the breast ; a blackish area covers the greater part of the dorsal fin, crosses the posterior part of the body,



Text-fig. 22.—*Chætodon gardineri*. Holotype. × ½.

and terminates on basal part of anal fin ; dorsal with a pale margin, the soft fin with a narrow dark line separating this from the dark area ; anal with a similar pale border and inframarginal dark line ; caudal yellowish, with a rather broad dusky posterior margin ; pectorals and pelvics pale.

Remarks.—In addition to the specimen mentioned above, this description includes three examples from Muscat, Gulf of Oman, 120 to 158 mm. in total length, sent to the British Museum by Mr. Jayakar, and identified by Dr. Boulenger as *Chætodon selene*, a species found in the East Indies, Philippines and Japan. A specimen 150 mm. in length has been selected from these as the holotype.

I have much pleasure in naming this species after Prof. J. Stanley Gardiner, F.R.S., the Secretary to the Committee of the " John Murray " Expedition.

Family Histiopteridæ.

Histiopterus spinifer, Gilchrist.

See Barnard, 1927, Ann. S. Afr. Mus. XXI, p. 620, pl. xxxi, fig. 2.

Occurrence :

St. 24, Gulf of Aden, OT, 73–200 m. ; 1 (150 mm.).

Distribution.—Gulf of Aden, South-east Africa from Mossel Bay to Natal.

Family Labridæ.

Lepidaplois trilineatus, Fowler.

Lepidaplois trilineatus, Fowler, 1934, Proc. Acad. Nat. Sci. Philad. LXXXVI, p. 492, fig. 47.

Occurrence :

St. 24, Gulf of Aden, OT, 73–200 m. ; 1 (220 mm.).

Distribution.—Gulf of Aden, Coast of Natal.

Remarks.—This species was known previously only from the unique holotype (A.N.S.P. No. 55993), 230 mm. in length, from Natal. The example obtained by the " John Murray " Expedition has ten soft rays in the dorsal fin, but otherwise agrees very well with Fowler's description.

Family Champsodontidæ.

Champsodon omanensis, Regan.

Champsodon omanensis, Regan, 1908, Trans. Linn. Soc. Lond., Zool. XII, p. 245, pl. xxvii, fig. 1.

Occurrence :

St. 70, Gulf of Oman, OT, 196 m. ; 15 (70–113 mm.).

St. 75, Gulf of Oman, OT, 201 m. ; 2 (97, 110 mm.).

St. 89, Arabian Sea, OT, 135–183 m. ; 1 (85 mm.).

St. 194, Gulf of Aden, AT, 220 m. ; 8 (52–110 mm.).

Distribution.—Gulf of Aden, Arabian Sea, Gulf of Oman.

Champsodon capensis, Regan.

Champsodon vorax (*non* Günther), Alcock, 1889, J. Asiat. Soc. Bengal, LVIII (2), p. 302 ; 1899, Cat. Indian Deep-sea Fish. p. 47 ; 1900, Illust. Zool. " Investigator ", pl. xxviii, fig. 5.

Champsodon capensis, Regan, 1908, *t.c.*, p. 244, pl. xxvii, fig. 2 ; Barnard, 1927, Ann. S. Afr. Mus. XXI, p. 432, pl. xviii, fig. 2.

Champsodon arafurensis, Regan, 1908, *t.c.*, p. 245 ; Weber, 1913, " Siboga "-Exped., Fishes, p. 146.

Occurrence :

St. 105, Zanzibar area, AT, 238–293 m. ; 48 (40–110 mm.).

St. 106, Zanzibar area, AT, 183–194 m. ; 250 (40–92 mm.).

St. 107, Zanzibar area, AT, 421–457 m. ; 1 (62 mm.).

Distribution.—South-east Africa, near Zanzibar, off the Malabar Coast, Bay of Bengal, Indo-Australian Archipelago.

Remarks.—Examination of this large series of specimens suggests that *C. arafurensis* cannot be maintained as a distinct species.

Family Opisthognathidæ.

Stalix omanensis, sp. n.

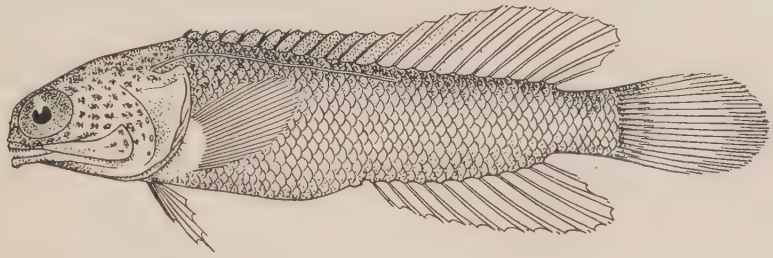
Occurrence :

St. 72, Gulf of Oman, AT, 73 m. ; 1 (42 mm.). Holotype.

Distribution.—Gulf of Oman.

Description.—Depth of body about 4 in the length, length of head a little more than $3\frac{1}{4}$. Diameter of eye more than 4 times interorbital width and 3 in length of head. Maxillary extending well beyond eye, but not nearly reaching margin of præoperculum. Teeth

in jaws in narrow bands anteriorly, becoming uniserial laterally ; no teeth on vomer or palatines. 16 or 17 gill-rakers on lower part of anterior arch. About 43 scales in a longitudinal series ; lateral line extending along back close to base of dorsal fin, terminating nearly opposite second soft ray. Dorsal XI 11 ; first seven spines forked, the anterior



TEXT-FIG. 23.—*Stalix omanensis*. Holotype. × 2½.

ones more deeply and widely forked than the posterior ones. Anal II 11 ; origin below commencement of soft dorsal. Pectoral with 20 rays, as long as pelvics and rather more than half as long as head. Caudal rounded (?) ; caudal peduncle about as long as deep. Pale brownish ; rather darker on back ; head with some small dark spots ; fins all uniform.

REMARKS.—This species differs from *S. histrio*, Jordan & Snyder, from Japan, the only other known species, in having more numerous gill-rakers, rather larger scales, more soft dosal rays, and a different coloration.

Family OWSTONIIDÆ.

Parasphenanthias weberi, Gilchrist.

Parasphenanthias weberi, Gilchrist, 1922, Rep. Fish. Mar. Biol. Surv. II (1921), Spec. Rep. III, p. 69, pl. x, fig. 2.
Owstonia weberi, Barnard, 1927, Ann. S. Afr. Mus. XXI, p. 493.

OCCURRENCE :

St. 106, Zanzibar area, AT, 183–194 m. ; 1 (130 mm.).

DISTRIBUTION.—Coast of Natal, near Zanzibar ; in deep water.

DESCRIPTION.—Depth of body about equal to length of head, which is 3¼ in that of fish (without caudal). The maxillary extends to a little beyond level of middle of eye. Teeth in a single series throughout in both jaws, slender, curved, and flaring outwards. There are two small spines at the angle of the præoperculum, and four rather stronger, anteriorly directed spines on its lower edge. About 30 gill-rakers on lower part of anterior arch. The scales are all missing, but there appear to have been about 35 in a longitudinal series ; lateral lines of the two sides connected with each other across the nape just in front of the origin of the dorsal fin. The dorsal fin appears to have only 3 true spines, followed by 6 simple and 15 (or 16) branched articulated rays. The anal has a single spine, followed by 1 simple and 13 (or 14) branched articulated rays.

REMARKS.—The genus *Parasphenanthias* is closely related to *Owstonia* and *Sphenanthias*, differing from the former mainly in the larger scales and the form of the body, and from the latter in having the lateral lines confluent in front of the dorsal fin. *Sphenanthias sibogæ* has been described as having nine spine-like rays in the dorsal fin, but Dr. L. F. de Beaufort, who has examined the type-specimens, kindly informs me that there are

27 rays in the fin, of which the first 4 are flexible spines, the next 5 articulated simple rays, and the remaining 18 are branched rays.

The genus *Owstonia* was placed by Tanaka in the family Opisthognathidæ, but has been regarded by Jordan and others as the type of a distinct family, Owstoniidæ. Other authors have placed these fishes in the subfamily Anthiinæ of the Serranidæ. In a recent paper, Myers (1935, 'Smithson. Misc. Coll.' XCI, No. 23, Publ. 3347, p. 1) points out that "*Owstonia*, *Sphenanthias*, *Parasphenanthias*, *Loxopseudochromis* and *Opsipseudochromis* form a closely interrelated group of deep-water fishes that is apparently rather close to the Opisthognathidæ but not to the Pseudochromidæ". Dr. Myers adds that he intends to treat this assemblage of genera more fully in the near future.

Family Bembropsidæ.

Bembrops platyrhynchus (Alcock).*

Bathypercis platyrhynchus, Alcock, 1893, J. Asiat. Soc. Bengal, LXII (2), p. 177, pl. ix, fig. 1.
Bembrops platyrhynchus, Alcock, 1894, *ibid.* LXIII (2), p. 118; 1898, Illust. Zool. "Investigator", pl. xx, fig. 6.
Bembrops caudimacula, Alcock, 1894, J. Asiat. Soc. Bengal, LXIII (2), p. 118; 1899, Cat. Indian Deep-sea Fish. p. 48.

Occurrence:

St. 35, Gulf of Aden, OT, 457–549 m.; 2 (198, 202 mm.).

Distribution.—Indian Ocean.

Description.—Depth of body $5\frac{2}{3}$ to nearly 6 in the length, length of head (from tip of lower jaw to end of opercular flap) $2\frac{1}{5}$ to $2\frac{1}{3}$. Length of snout about equal to diameter of eye, which is about 4 in length of head. Length of fleshy process on maxillary less than $\frac{1}{2}$ diameter of eye. About 16 gill-rakers on lower part of anterior arch. 43 to 46 scales in the lateral line, which rises sharply above the pectoral fin. Dorsal VI 14–15; first ray of spinous fin not prolonged, length less than $\frac{1}{3}$ that of head. Anal 15–16. Pectoral with 25 or 26 rays, length about $\frac{3}{5}$ that of head and much longer than that of pelvic. Caudal rounded; caudal peduncle a little longer than deep. Yellowish-brown above, paler below; all the scales on back and upper parts of sides margined with dark brown or black; some scattered yellowish-green markings on upper part of head, opercular flap, and on body; both dorsal fins wholly blackish; anal with a dusky base and white margin; caudal greyish, with a darker streak along its lower edge, and with an indistinct round dark spot just behind the base in its upper half; pectoral and pelvics more or less dusky.

Remarks.—Apart from a difference in the coloration of the fins, the specimens described above agree very well with one from the Andaman Sea, 205 mm. in total length, received from the Indian Museum as *Bemprops platyrhynchus*. This specimen has a broad oblique black band near the base of the spinous dorsal, separated by a pale area from a narrow black margin; the anal fin is uniformly pale, and there is no trace of a black spot on the upper half of the caudal fin.

Alcock regarded his species as synonymous with *B. caudimacula*, Steindachner, from Japan, but that species appears to have a longer snout and smaller eye. *B. gobioides*

* I am indebted to Dr. S. L. Hora, of the Indian Museum, for the loan of the holotype of *Bathypercis platyrhynchus*. This specimen (No. 13437) is about 108 mm. in total length.

(Goode), from the Atlantic, also regarded by Alcock as synonymous, is described as having 65 scales in the lateral line.*

Bembrops adenensis, sp. n.

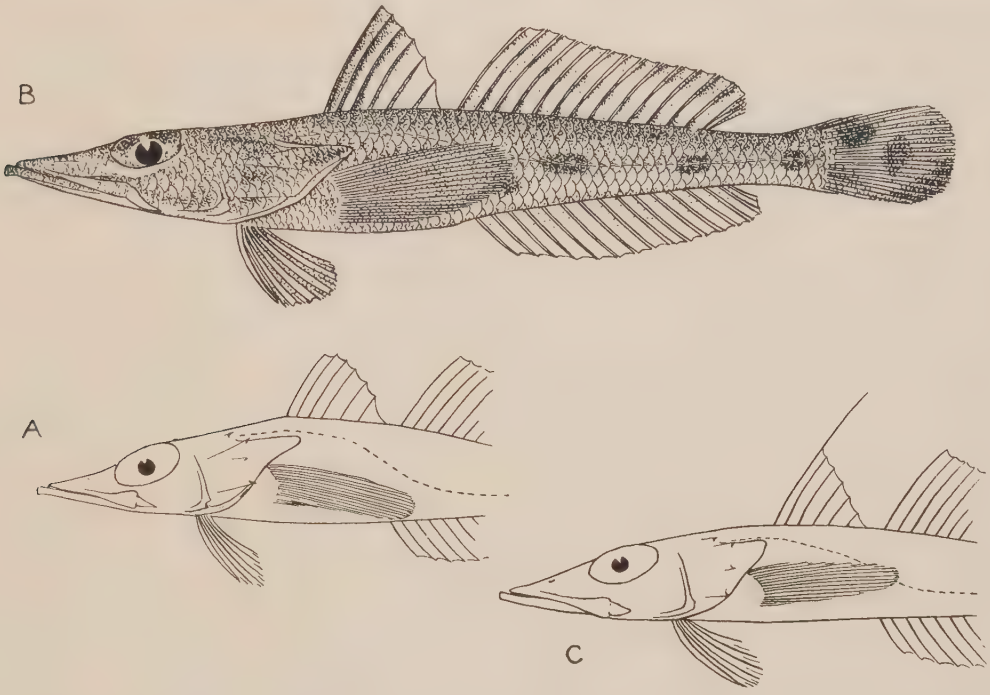
Occurrence :

St. 16, Gulf of Aden, AT, 186 m. ; 8 (30–155 mm.).

St. 194 ,, AT, 220 m. ; 55 (50–205 mm.). Holotype 193 mm.

Distribution.—Gulf of Aden.

Description.—Depth of body 6 to $6\frac{1}{2}$ in the length, length of head $2\frac{1}{8}$ to $2\frac{1}{3}$. Length of snout $3\frac{3}{4}$ to more than 4 in that of head, diameter of eye $4\frac{1}{4}$ to nearly 5. Length of fleshy process on maxillary usually at least $\frac{1}{2}$ diameter of eye. About 15 gill-rakers on



Text-fig. 24.—A. Head and anterior part of body of *Bembrops platyrhynchus*. × $\frac{1}{2}$. B. *Bembrops adenensis*. Holotype. × $\frac{2}{3}$. C. Head and anterior part of body of holotype of *Bembrops nematopterus*. × $\frac{1}{2}$.

lower part of anterior arch. 46 to 48 scales in lateral line, which rises rather gradually above the pectoral fin. Dorsal VI 14–15 ; first ray of spinous fin not prolonged, length about $\frac{1}{3}$ that of head. Anal 16. Pectoral with 25 or 26 rays; length more than $\frac{1}{2}$ that of head and much longer than that of pelvic. Caudal rounded ; caudal peduncle a little longer than deep. Yellowish-brown above, paler below; the scales not very distinctly margined with darker as in the previous species ; a series of 3 or 4 dark brown blotches on each side in the region of the lateral line ; sometimes some small scattered yellowish-green markings on head and body ; spinous dorsal with the membrane between the first two or three rays blackish, but the remainder of the fin pale ; often some black spots and stripes on soft dorsal ; anal pale ; caudal yellowish-brown, with a blackish mark along its

* The specimens recorded from the Gulf of Guinea, 120 to 220 metres, by Cadenat (Rev. Trav. Off. Pêches Marit. X, fasc. 4, 1937, p. 513, fig. 49) as *B. caudimaculata*, have 60 to 62 scales in the lateral line.

lower edge, and with an oval blackish spot just behind the base in its upper half, which is more distinct in the young but persists clearly in the adult ; sometimes some other dark marks on fin ; pectorals and pelvics more or less dusky.

Remarks.—This species differs from *B. platyrhynchus* in the more slender body, smaller eye, longer process on the maxillary, less arched anterior portion of the lateral line, rather smaller scales, and in the coloration of the fins. It appears to be close to *B. caudimacula*, Steindachner, known only from the original description of the unique holotype, 140 mm. in total length, but that species appears to have a larger head, longer snout, and larger scales.

Bembrops nematopterus, sp. n.

Occurrence :

St. 105, Zanzibar area, AT, 238–293 m. ; 9 (120–185 mm.). Holotype 163 mm.

St. 106, Zanzibar area, AT, 183–194 m. ; 3 (130–182 mm.).

Distribution.—Near Zanzibar.

Description.—Depth of body about 7 in the length, length of head $2\frac{1}{2}$ to nearly $2\frac{2}{3}$. Length of snout $3\frac{2}{5}$ to $3\frac{3}{5}$ in that of head, diameter of eye about 4. Length of fleshy process on maxillary not more than $\frac{2}{5}$ diameter of eye. 15 to 17 gill-rakers on lower part of anterior arch. 42 to 45 scales in lateral line, which rises rather sharply above the pectoral fin. Dorsal VI 14-15 ; first ray of spinous fin prolonged, its length generally more than $\frac{1}{2}$ that of head. Anal 15–16. Pectoral with about 25 rays, length $\frac{1}{2}$ or a little more than $\frac{1}{2}$ that of head and much longer than that of pelvic. Caudal rounded ; caudal peduncle a little longer than deep. Yellowish-brown above, paler below ; scales on back and upper parts of sides margined with dark brown or black ; 2 to 4 indistinct dark blotches in the region of the lateral line, and often a row of 8 to 10 paler blotches on lower part of side ; some small, scattered, yellowish-green markings on head and body ; distal part of spinous dorsal black, the remainder of the fin pale ; soft dorsal sometimes with dark spots ; anal more or less pale ; caudal yellowish-brown, with a black streak along its lower edge ; young with an oval blackish spot just behind the base on upper half of caudal, disappearing in the adult ; pectorals and pelvics more or less dusky.

Remarks.—In many respects this species seems to resemble *B. caudimacula*, but Steindachner makes no mention of any prolonged ray in the spinous dorsal, and the eye appears to be smaller in the Japanese species. *B. filifer**, Fowler, from the Philippines, is closely related, but has a more slender body, smaller scales, and a different coloration. *B. filifera*, Gilbert, from Hawaii, another species with a filamentous first dorsal spine, has 64 or 65 scales in the lateral line.

Family Uranoscopidæ.

Uranoscopus archionema, Regan.

Occurrence :

St. 106, Zanzibar area, AT, 238–293 m. ; 3 (65–140 mm.).

Distribution.—South-east Africa, from Mossel Bay to Zululand ; near Zanzibar.

* This name is preoccupied by Gilbert's species, and I, therefore, propose *B. filamentosa*, **nom. n.** as a substitute.

Uranoscopus crassiceps, Alcock.

Occurrence :

St. 16, Gulf of Aden, AT, 186 m. ; 1 (140 mm.).

St. 194, Gulf of Aden, AT, 220 m. ; 48 (110–200 mm.).

Distribution.—Gulf of Aden ; Ganjam, Coromandel and Malabar coasts.

Family Chiasmodontidæ.

Pseudoscopelus cephalus, Fowler ?

Pseudoscopelus cephalus, Fowler, 1934, Proc. Acad. Nat. Sci. Philad. LXXXV, p. 361, fig. 111.

Occurrence :

St. 131 D, Arabian Sea, N. 200, 2500–0 m. ; 1 (36 mm.).

Remarks.—This young specimen may be referable to Fowler's species, described from a single specimen (U.S.N.M. No. 93142), 89 mm. long, from the Jolo Sea at a depth of 952 metres.

Family Siganidæ.

Siganus nebulosus (Quoy & Gaimard).

Occurrence :

St. —, Shore collection at Zukhair Islands, Red Sea ; 1 (108 mm.).

Distribution.—East Coast of Africa and the Red Sea to Australia.

Family Trichiuridæ.

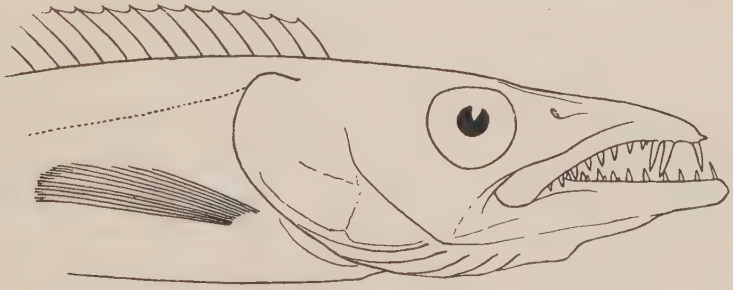
Aphanopus microphthalmus, sp. n.

Occurrence :

St. 34, Gulf of Aden, AT, 1022 m. ; 1 (600 mm.). Holotype.

Distribution.—Gulf of Aden.

Description.—Depth of body (measured opposite posterior margin of operculum) about $9\frac{1}{2}$ in the length (without caudal), length of head (from tip of lower jaw to margin



Text-fig. 25.—Head and anterior part of body of holotype of *Aphanopus microphthalmus*. × $\frac{1}{2}$.

of operculum) $4\frac{1}{3}$. Snout as long as postorbital part of head and more than twice as long as diameter of eye, which is a little greater than the interorbital width and nearly $5\frac{3}{4}$ in length of head (including lower jaw). Maxillary extending to below anterior part of eye ;

lower jaw strongly projecting; each præmaxillary with 3 large canine teeth anteriorly, followed by a row of much smaller teeth; 11 or 12 rather larger teeth in the lower jaw. The two dorsal fins together with 95 or 96 rays.* Length of dagger-like anal spine about $\frac{3}{4}$ diameter of eye. Pectoral with 12 rays. Uniformly blackish.

Remarks.—In *Aphanopus carbo*, Lowe, *A. minor*, Collett, and *A. schmidti*, Sæmundsson, three closely related species from the North Atlantic, the body is longer (depth 10 to 12, head about 5, in the length), the snout is rather longer than the postorbital part of the head, and the diameter of the eye is distinctly larger (about 5 in length of head in specimens of 950 to 1100 mm. in total length). The smaller teeth seem to be somewhat stronger than those of *A. microphthalmus*. Another species, *A. simonyi*, Steindachner, from the Canaries, has an increased number of rays in the dorsal fins (45–47 + 105–107).

Family Gobiidæ.

[*Gobius*] *cometes*, Alcock.

Gobius cometes, Alcock, 1890, Ann. Mag. Nat. Hist. (6) VI, p. 208, pl. viii, fig. 2; 1898, Illust. Zool. "Investigator", pl. xx, fig. 3; 1899, Cat. Indian Deep-sea Fish. p. 71.

Occurrence:

St. 16, Gulf of Aden, AT, 186 m.; 5 (88–115 mm.).

St. 194, Gulf of Aden, AT, 220 m.; 10 (40–60 mm.).

Distribution.—Gulf of Aden, Gulf of Oman, Ganjam Coast; in deep water.

Remarks.—This species seems to come nearest to the genus *Acentrogobius*, Bleeker, in the key given by Koumans (1931, 'Prelim. Rev. Gen. Gobioid Fish.'), but the author, who has examined specimens of *G. cometes*, informs me that it will probably prove to be the type of a new genus. There is a specimen in the British Museum from the Gulf of Oman.

Oplopomus caninoides (Bleeker).

Occurrence:

St. 37, Gulf of Aden, AT, 18–22 m.; 1 (65 mm.).

Distribution.—Gulf of Aden, Persian Gulf, East Indies, etc.

Gnatholepis sp. ?

Occurrence:

St. 106, Zanzibar area, AT, 183–194 m.; 120 (45–68 mm.).

Remarks.—All these specimens are in a poor condition, most of the scales and a large part of the skin being missing, so that it is difficult to place them in a genus with any degree of certainty. Dr. F. P. Koumans, of the Rijksmuseum van Natuurlijke Historie, Leiden, has kindly examined two or three of the specimens obtained by the "John Murray" Expedition, and writes that they probably belong to the genus *Gnatholepis*, but that he is unable to identify them specifically.

* The rays of the dorsal fins are much broken in this specimen, and it is impossible to be sure where the interspace between the two fins occurs.

Family Callionymidæ.

Callionymus carebares, Alcock.

Callionymus carebares, Alcock, 1890, Ann. Mag. Nat. Hist. (6) VI, p. 209, pl. viii, fig. 8; 1898, Illust. Zool. "Investigator", pl. xx, fig. 4; 1899, Cat. Indian Deep-sea Fish. p. 73.

Occurrence:

St. 70, Gulf of Oman, OT, 196 m.; 1 (127 mm.).

St. 89, Arabian Sea, OT, 135–183 m.; 35 (65–102 mm.).

St. 194, Gulf of Aden, AT, 220 m.; 20 (120–175 mm.).

Distribution.—Gulf of Aden, Gulf of Oman, Arabian Sea, Ganjam Coast, Malabar Coast.

Remarks.—This species is well distinguished from *C. kaianus* by the larger head, larger eye, and the form of the præopercular spine, as well as by the different coloration.

Callionymus kaianus, Günther.

Callionymus kaianus, Günther, 1880, Shore Fish. "Challenger", p. 44, pl. xix, fig. B; Alcock, 1899, *t.c.*, p. 74; Regan, 1908, Trans. Linn. Soc. London, Zool. XII, p. 248; Weber, 1913, "Siboga"-Exped., Fishes, p. 524.

Occurrence:

St. 106, Zanzibar area, AT, 183–194 m.; 1 female (98 mm.).

Distribution.—Near Zanzibar, Saya de Malha Bank, Malabar Coast, Indo-Australian Archipelago.

Callionymus maldivensis, Regan.

Callionymus maldivensis, Regan, 1908, *t.c.*, p. 247, pl. xxx, fig. 3.

Occurrence:

St. 27, Gulf of Aden, OT, 37–91 m.; 2 (73, 88 mm.).

Distribution.—Gulf of Aden, Maldives.

Remarks.—These two small specimens, which appear to be females, differ somewhat in coloration from the types of the species, but seem to be otherwise similar. The general colour is greyish-brown, the head and upper part of the body being spotted and marbled with paler and darker; some indistinct dark cross-bars on the back and a row of small, rounded, pale spots along lower part of side; spinous dorsal brown, with pale spots and vermiculations, and with a large dark brown spot surrounding the distal part of the third ray; soft dorsal with 3 or 4 series of oblong dark spots; anal blackish or dusky, except at base; caudal with dark cross-bars.

Callionymus filamentosus, Cuvier & Valenciennes.

Occurrence:

St. 80, South Arabian Coast, SD 4, 16–22 m.; 2 (31, 64 mm.).

Distribution.—Red Sea, Coast of Arabia, Persian Gulf, Indian Ocean and Archipelago.

Remarks.—These small specimens appear to be referable to this species.

Callionymus bicornis, sp. n.

Occurrence :

St. 105, Zanzibar area, AT, 238–293 m. ; 6 (35–92 mm.). Holotype 92 mm.

Distribution.—Near Zanzibar, in deep water.

Description.—Depth of body $5\frac{3}{4}$ in the length, length of head (to gill-opening) about $3\frac{1}{4}$. Diameter of eye a little more than $2\frac{1}{2}$ in length of head ; eyes almost contiguous ; gill-openings small, superior ; præopercular spine stout, curved upwards at its extremity to form a tooth-like process of the same size as the single one on its upper edge ; occipital region smooth, covered by skin. Lateral line single. Dorsal IV, 9 ; spinous dorsal with the first two rays produced ; first ray reaching beyond base of last ray of soft dorsal when laid back, its length nearly $2\frac{1}{4}$ in that of fish ; length of third ray about $\frac{2}{3}$, of fourth ray $\frac{2}{5}$ that of head. Anal 8 ; the rays increasing in length posteriorly. Pectorals shorter than pelvics ; both fins extending beyond origin of anal ; a rather narrow membrane joining

Text-fig. 26.—*Callionymus bicornis*. Holotype. × $1\frac{1}{4}$.

inner ray of pelvic to base of pectoral, but scarcely covering bases of lower pectoral rays. Caudal longer than head. Pale yellowish, with 3 irregular and rather faint darker cross-bars on back and upper parts of sides ; spinous dorsal blackish, barred with white ; soft dorsal and anal pale, margins blackish, at least posteriorly ; caudal pale, with the posterior margin blackish ; pectoral pale yellowish ; pelvic similarly coloured, with a black blotch distally.

The above description based upon the holotype only.

Remarks.—Closely related to *C. phasis*, Günther, and *C. apricus*, McCulloch, both from Australia, differing mainly in the form of the præopercular spine. Whitley (1931, 'Rec. Austral. Mus.' XVIII, p. 115) has proposed the generic name *Yerutius* for these species, with *C. rubrovinctus*, Gilbert, from the Hawaiian Islands, all deep-water forms. This genus is said to differ from *Callionymus* in having " very large eyes, præopercular spine curved upward distally and without an antrorse spine below it, no broad ventral membrane covering bases of lower pectoral rays, dorsal rays branched, head and body not depressed ".

Callionymus sp.

Occurrence :

St. 53, South Arabian Coast, TD 4, $13\frac{1}{2}$ m. ; 1 (36 mm.).

Synchiropus altivelis, Regan.

Synchiropus altivelis, Regan, 1908, *t.c.*, p. 249, pl. xxx, fig. 2.

Occurrence :

St. 27, Gulf of Aden, OT, 37–91 m. ; 1 male (80 mm.).

Distribution.—Gulf of Aden, Seychelles Group.

Remarks.—The type is a small specimen, 58 mm. in total length. The larger male obtained by the "Mabahiss" differs in the following particulars: The diameter of the eye is more than 4 in the length of the head, which is about $3\frac{1}{4}$ in that of the fish. The spinous dorsal fin is much elevated, with the rays produced beyond the membrane and extending

Text-fig. 27.—*Synchiropus altivelis*. St. 27. × $1\frac{1}{2}$.

beyond middle of soft dorsal when laid back ; the length of the first ray $1\frac{2}{3}$ times, that of the last $1\frac{2}{5}$ times that of the head. Upper part of head and body with 6 reddish cross-bars, the first between the eyes, the last behind the soft dorsal ; some irregular dark brown markings on back near origin of spinous dorsal fin, and 3 large brown blotches on lower part of each side ; a large dusky area on the throat ; spinous dorsal with a reddish shade distally and with numerous rounded or oval brown spots ; a similar shade on soft dorsal, which is provided with dark blotches, especially posteriorly ; anal blackish ; caudal with 2 dark brown cross-bars, and with a reddish shade in its upper half ; pectoral pale yellowish, with a few dark spots near its margin ; pelvics with some rounded or elongate yellowish-brown areas margined with dark brown, and with dark edges.

This species is allied to *S. lineolatus*, Cuvier & Valenciennes, differing in the coloration and in the form of the præopercular spine.

Family Blenniidæ.

Petroscirtes mitratus, Rüppell.

Occurrence :

St. 25, Gulf of Aden, Hand Net, Surface (Sargasso Colony) ; 4 (34–44 mm.).

Distribution.—Red Sea, Gulf of Aden, Mekran Coast.

Petroscirtes ancylodon, Rüppell.

Occurrence :

St. 25, Gulf of Aden, Hand Nat, Surface (Sargasso Colony) ; 1 (27 mm.).

Distribution.—Red Sea, Gulf of Aden.

Family Brotulidæ.

Neobythites steatiticus, Alcock.

Occurrence :

St. 16, Gulf of Aden, AT, 186 m. ; 1 (27 mm.).

St. 35, Gulf of Aden, OT, 457–549 m. ; 2 (160, 210 mm.).

St. 105, Zanzibar area, AT, 238–293 m. ; 1 (112 mm.).

Distribution.—Indian Ocean and Archipelago.

Remarks.—The specimen from Station 105 has two ocelli on the dorsal fin, but appears to agree in other respects with those from Station 35.

Monomitopus nigripinnis (Alcock).

Occurrence :

St. 108, Zanzibar area, AT, 786 m. ; 1 (270 mm.).

Distribution.—Indian Ocean.

Dicrolene introniger, Goode & Bean.

Occurrence :

St. 54, South Arabian Coast, AT, 1046 m. ; 6 (115–180 mm.).

Distribution.—Atlantic ; Indian Ocean.

Remarks.—There do not appear to be any marked differences between specimens from the Atlantic and Indian Oceans.

Dicrolene longimana, Smith & Radcliffe.

Occurrence :

St. 33, Gulf of Aden, AT, 1295 m. ; 1 (120 mm.).

St. 34, Gulf of Aden, AT, 1022 m. ; 3 (130–190 mm.).

St. 184, Gulf of Aden, AT, 1270 m. ; 1 (108 mm.).

Distribution.—Gulf of Aden, Philippines.

Remarks.—This species is new to the British Museum collection.

Dicrolene multifilis (Alcock).

Occurrence :

St. 115, Zanzibar area, OT, 640–658 m. ; 1 (145 mm.).

Distribution.—Indian Ocean.

Remarks.—This specimen is in poor condition, but appears to be referable to this species.

Dicrolene nigricaudis (Alcock).

Occurrence :

St. 145, Maldive area, AT, 494 m. ; 1 (135 mm.).

St. 176, Gulf of Aden, AT, 655–732 m. ; 1 (168 mm.).

Distribution.—Indian Ocean.

Bassobythites brunswigi, Brauer.

Bassobythites brunswigi, Brauer, 1906, " Valdivia " Tiefsee-Fische, p. 307, pl. xiv, fig. 7.

Occurrence :

St. 159, Maldive area, MT, 914–1463 m. ; 1 (850 mm.).

Distribution.—Off the coast of N.E. Africa, near Maldives.

Remarks.—This species was known previously only from the unique holotype, 900 mm. in total length, obtained by the " Valdivia " at 6° 18′ 8″ N., 49° 32′ 5″ E., at a depth of 1079 metres.

Bassozetus glutinosus (Alcock).

Occurrence :

St. 26, Gulf of Aden, AT, 2312 m. ; 1 (270 mm.).

Distribution.—Indian Ocean.

Porogadus trichiurus (Alcock).

Occurrence :

St. 26, Gulf of Aden, AT, 2312 m. ; 2 (175, 180 mm.).

St. 62, Arabian Sea, AT, 1893 m. ; 1 (135 mm.).

St. 118, Zanzibar area, AT, 1789 m. ; 1 (130 mm.).

Distribution.—Indian Ocean.

Glyptophidium macropus, Alcock.

Occurrence :

St. 35, Gulf of Aden, OT, 457–549 m. ; 16 (190–215 mm.).

Distribution.—Indian Ocean.

Glyptophidium longipes, sp. n.

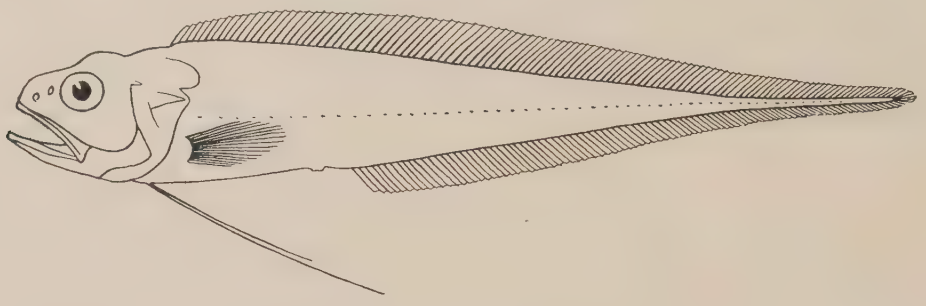
Occurrence :

St. 115, Zanzibar area, OT, 640–658 m. ; 24 (200–250 mm.). Holotype 240 mm.

Distribution.—Near Zanzibar.

Description.—Depth of body a little more than 6 in the total length, length of head (measured to tip of flat spine on operculum) a little more than 5. Snout about as long as eye, diameter of which is a little greater than interorbital width and 4 in length of head. Jaws equal anteriorly ; teeth in a ∧-shaped band on the vomer and in a narrow band on the palatines. Operculum with a thin, flat spine ; pseudobranchiæ consisting of about 8 to 10 filaments ; 25 rather long gill-rakers on lower part of anterior arch. Pectoral with

21 rays. Each pelvic ray bifid, its length at least $1\frac{1}{2}$ times that of head. Pyloric appendages small, finger-like, arranged in a ring round the pylorus.



TEXT-FIG. 28.—Outline sketch of holotype of *Glyptophidium longipes*. × $\frac{1}{2}$.

REMARKS.—The above description is based almost entirely upon the holotype, as most of the other specimens are in very poor condition. *G. longipes* is related to *G. macropus*, from which it may be distinguished by the longer and more slender body, narrower head, longer pelvic rays, etc.

Lamprogrammus niger, Alcock.

OCCURRENCE :

St. 124, Zanzibar area, MT, 914 m. ; 1 (430 mm.).

St. 143, Maldive area, AT, 797 m. ; 8 (360–400 mm.).

DISTRIBUTION.—Indian Ocean and Archipelago.

Lamprogrammus fragilis, Alcock.

OCCURRENCE :

St. 34, Gulf of Aden, AT, 1022 m. ; 7 (415–570 mm.).

St. 54, South Arabian Coast, AT, 1046 m. ; 6 (175–250 mm.).

DISTRIBUTION.—Indian Ocean.

REMARKS.—This species may prove to be identical with the preceding.

Pycnocraspedum squamipinne, Alcock.

OCCURRENCE :

St. 105, Zanzibar area, AT, 238–293 m. ; 2 (125, 130 mm.).

DISTRIBUTION.—Near Zanzibar, Bay of Bengal.

Luciobrotula bartschi, Smith & Radcliffe.

Luciobrotula bartschi, Smith & Radcliffe, 1913, in Radcliffe, Proc. U.S. Nat. Mus. XLIV, p. 171, pl. xvi, fig. 2.

OCCURRENCE :

St. 34, Gulf of Aden, AT, 1022 m. ; 1 (175 mm.).

DISTRIBUTION.—Gulf of Aden, Philippines.

REMARKS.—This species was known previously only from the holotype, obtained by the " Albatross " in Palawan Passage (10° 57′ 45″ N., 118° 38′ 15″ E.), at a depth of 685 metres.

Catætyx squamiceps (Lloyd).

Diplacanthopoma squamiceps, Lloyd, 1909, Mem. Ind. Mus. II, p. 165; Illust. Zool. "Investigator" pl. xlii, fig. 2.

Occurrence:

St. 34, Gulf of Aden, AT, 1022 m.; 2 (95, 130 mm.).

St. 184, Gulf of Aden, AT, 1270 m.; 1 (115 mm.).

Distribution.—Gulf of Aden, Arabian Sea.

Grammonus robustus, Smith & Radcliffe.

Grammonus robustus, Smith & Radcliffe, 1913, *t.c.*, p. 168, pl. xiii, fig. 4.

Occurrence:

St. 35, Gulf of Aden, OT, 457–549 m.; 1 (88 mm.).

Distribution.—Gulf of Aden, Philippines.

Remarks.—This specimen differs from that described by Smith and Radcliffe only in the more slender body and less arched head—differences which may well be due to the smaller size of the fish. The type was 143 mm. in total length.

Diplacanthopoma raniceps, Alcock.

Occurrence:

St. 193, Gulf of Aden, AT, 1061–1080 m.; 1 (270 mm.).

Distribution.—Gulf of Aden, Andaman Sea.

Remarks.—The subgeneric name, *Sarcocara*, proposed by Smith and Radcliffe, must be abandoned. The form of the gill-rakers in *D. brachysoma*, Günther, is exactly the same as in *D. brunnea*, Smith & Radcliffe, and in *D. raniceps*, Alcock, and *D. rivers-andersoni*, Alcock.

Diplacanthopoma brunnea, Smith & Radcliffe.

Occurrence:

St. 62, Arabian Sea, AT, 1893 m.; 1 (450 mm.).

Distribution.—Arabian Sea, Philippines.

A SYNOPSIS OF THE OCEANIC GENERA OF BROTULIDÆ.

The difficulty experienced in determining some of the Brotulids collected by the "John Murray" Expedition has led me to examine as many species as possible with a view to investigating the characters commonly used for the separation of the genera in this family. The British Museum collection contains the material obtained by the "Challenger", which is rich in types; it also includes a number of specimens collected by the "Investigator", of which nearly all were described by Alcock in his catalogue of Indian deep-sea fishes; there are also a few specimens obtained by the "Albatross" and by the "Travailleur" and "Talisman". Through the kindness of Dr. Leonard P. Schultz, I have been able to examine a very interesting series of Brotulids from the collection of the

United States National Museum, including a number of paratypes of species from the Philippines and Dutch East Indies described by Smith and Radcliffe.* The total material available, however, has proved quite inadequate for a systematic revision of even the oceanic members of this family, but it has been thought to be helpful to publish a tentative arrangement of the genera occurring in deep water. Of the 47 oceanic genera here recognized I have been able to examine representatives of 30 ; the remainder have had to be included on the basis of published descriptions and figures.

The work of Smith and Radcliffe mentioned above represented the first attempt to arrange the Brotulid genera in accordance with their supposed relationships, and has proved an invaluable basis for the present work. In the key which follows I have tried, as far as possible, to give the genera a natural arrangement, and, although this arrangement is still in part more or less tentative, it is hoped that it will at least provide a basis for future work on the group. Only those genera which are habitually found beyond the " hundred-fathom line ", or which might be expected to stray into deep or moderately deep water, are considered here :† all littoral genera, as well as the cave-dwelling forms from Cuba and elsewhere, have been omitted.‡

Following the key, I have given a synopsis of the oceanic genera, with a list of the described species under each genus. Those species marked with an asterisk have been examined by me ; the remainder have been included on the basis of published descriptions.

Key to the Oceanic Genera.

I. Cleithra not greatly produced, the symphysis normally behind the eyes ; pelvics usually inserted behind eyes.

A. Snout and lower jaw without barbels.

B. Body covered with scales.

C. Gill-rakers on anterior arch usually well developed ; at least 6 long, pointed rakers (exclusive of rudiments) on lower part of arch ; head (normally) entirely scaled. Species (as far as known) oviparous.

D. Eyes developed.

E. Præopercular and opercular spines, if present, of small or moderate size, the longest not projecting beyond margin of operculum.

F. Head without prominent, frill-like crests ; lateral line, if developed, narrow, without specially modified scales.

G. Lateral line usually distinct, disappearing at middle or posterior part of body.

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* 1913, Proc. U.S. Nat. Mus. XLIV, pp. 135–176, pls. vii–xvii.

† These genera, which are doubtfully oceanic, have been placed in square brackets in the key, and are not included in the synopsis.

‡ A list of these genera, placed in chronological order, is as follows :

Lucifuga, Poey, 1858.
Nematobrotula, Gill, 1863.
Stygicola, Gill, 1863.
Othos, Castelnau, 1875.
Dermatopsis, Ogilby, 1896.
Monothrix, Ogilby, 1897.
Ogilbia, Jordan & Evermann, 1898.
Petrotyx, Heller & Snodgrass, 1903.
Eutyx, Heller & Snodgrass, 1903.
Dipulus, Waite, 1905.
Pseudobythites, Meek & Hildebrand, 1928.
Bidenichthys, Barnard, 1934.
Typhlias, Hubbs, 1938.

The genera *Bellottia*, Giglioli ; *Tilurus*, Kölliker ; *Tilurella*, Roule ; and *Tiluropsis*, Roule, are based upon larval or post-larval forms, believed to be Brotulids.

H. Operculum with a single, rather strong spine.
J. Mouth large, the jaws more or less equal anteriorly; pyloric appendages present.
K. Pectoral fins simple, none of the rays prolonged.
L. Pelvic rays bifid; bones of head firm . . 1. *Neobythites.*
LL. Pelvic rays simple; bones of head weaker, more cavernous.
M. Lateral line terminating on posterior part of body; 10 or 12 appendages forming a ring round the pylorus, sometimes extending along neighbouring part of gut.
N. Teeth in narrow bands; pelvic rays longer than head; pectoral narrow . 2. *Homostolus.*
NN. Teeth in broad bands; pelvic rays shorter than head; pectoral broader . 3. *Monomitopus.*
MM. Lateral line terminating at middle of body; a ring of 5 more rudimentary appendages round the pylorus . . . . . 4. *Monomeropus.*
KK. Lower pectoral rays prolonged, free or partially connected by membrane; bones of head somewhat cavernous; margin of præoperculum usually with 3 small, sharp spines; pyloric appendages few, small or rudimentary; pelvic rays simple or bifid 5. *Dicrolene.*
JJ. Mouth of moderate size, inferior; eye large; no pyloric appendages; pelvic rays simple . . 6. *Selachophidium.*
HH. Operculum with two short, flat spines; margin of præoperculum without spines; mouth rather small, terminal; pelvic rays short, bifid . . . . . 7. *Benthocometes.*
GG. Lateral line indistinct, rudimentary or absent, sometimes represented by one or more series of small pores; eye usually rather small.
O. Teeth villiform, in bands; gill-rakers long, at least near angle of arch.
P. Snout more or less swollen, produced above the mouth, which is small.
Q. Snout pointed; dorsal and anal incompletely united with caudal; 8 branchiostegals . . . 8. *Barathrodemus.*
QQ. Snout rounded, not distinctly overhanging mouth; dorsal and anal completely united with caudal; 6 branchiostegals . . . . . 9. *Barathrites.*
PP. Snout not produced above the mouth, which is terminal and usually large.
R. Head without large, distinct mucous cavities or pores, with a heavy covering of skin, which obscures angles of skull; opercular spine strong.
S. Pelvic fins present; no pyloric appendages . 10. *Bassogigas.*
SS. Pelvic fins absent; 4 short, knob-like pyloric appendages . . . . . 11. *Bassobythites.*
RR. Head with large, distinct mucous cavities or pores; angles of skull not usually obscured by thick, heavy skin.
T. Eyes normal.
V. Præoperculum expanded posteriorly to form a broad, rounded lobe, which sometimes extends nearly to edge of operculum; margin of

præoperculum without large mucous cavities; operculum unarmed, or with a single, feeble, flat spine.

w. Pectoral fins simple, none of the rays prolonged.

x. Pelvic rays bifid; præopercular lobe not nearly reaching edge of operculum 12. *Alcockia.*

xx. Pelvic rays simple; præopercular lobe nearly reaching edge of operculum 13. *Bassozetus.*

ww. Lower half of pectoral fin produced, rigid, oar-like; pelvic rays simple . 14. *Eretmichthys.*

vv. Præoperculum not expanded posteriorly, its margin with a series of large mucous cavities.

y. Pectoral fins short, none of the rays prolonged; no pyloric appendages; head usually with some small spines; lateral line, if apparent, represented by 3 series of small pores 15. *Porogadus.*

yy. Some or all of the pectoral rays prolonged; rudimentary pyloric appendages present; head without spines.

z. Rudimentary pseudobrachiæ present; only the lower pectoral rays prolonged 16. *Mixonus.*

zz. No pseudobranchiæ; nearly all the pectoral rays prolonged, filamentous 17. *Mastigopterus.*

tt. Eye-ball rudimentary, no iris or pupil apparent; præoperculum not expanded posteriorly; none of the pectoral rays prolonged . . . 18. *Leucicorus.*

oo. Teeth small, in a single series in jaws, and on vomer and palatines; gill-rakers few, small, tubercle-like; no pseudobranchiæ; no pyloric appendages . . . . . 19. *Enchelybrotula.*

ff. Head with prominent frill-like crests, the bones thin, covered with deciduous scales; operculum with a feeble, flat spine.

a. No lateral line; pseudobranchiæ well developed; pelvic fins present 20. *Glyptophidium.*

aa. Lateral line very broad, conspicuous, with a series of enlarged, plate-like scales; no pseudobranchiæ; no pelvic fins 21. *Lamprogrammus.*

ee. Præopercular and opercular spines very strong, the longest projecting beyond margin of operculum; head large, broad, without crests 22. *Acanthonus.*

dd. Eyes absent or hidden beneath the skin.

b. Præopercular and opercular spines very strong, the longest projecting beyond margin of operculum; pelvic rays bifid; mouth nearly terminal 23. *Tauredophidium.*

bb. Præoperculum and operculum without spines; pelvic rays simple; mouth small, inferior . . . . . 24. *Typhlonus.*

cc. Gill-rakers on anterior arch usually reduced to a few well-developed rakers near angle of arch; 2 to 5 only on lower part of arch, remainder rudimentary; head usually only partly scaled, sometimes entirely naked. Species (as far as known) viviparous.

c. Caudal fin differentiated, entirely free from dorsal and anal.

d. Cheeks and opercles scaled . . . . . [*Dinematichthys*].

dd. Cheeks and opercles not scaled . . . . . [*Brosmophycis*].

cc. Caudal fin not differentiated, united with dorsal and anal.

e. Opercles, cheeks and (usually) upper part of head scaled; lateral line present.

f. Pelvic fins present, sometimes very small; præoperculum unarmed, or with 2 or 3 feeble, pointed processes.

g. Lateral line narrow, comparatively inconspicuous; tail not very tapering; no canine teeth.

h. Palatine teeth present.

j. Vomerine teeth present; pelvic fins well developed; margin of præoperculum unarmed; no spines on interorbital region.

k. Lateral line single, distinct; 13 large, elongate pyloric appendages . . . . . 25. *Pycnocraspedum*.

kk. Lateral line double, never very distinct; pyloric appendages absent or represented by two flap-like structures.

l. No pyloric appendages; pelvic rays bifid . 26. *Luciobrotula*.

ll. Two flap-like appendages near pylorus; pelvic rays simple.

m. Head robust, rounded; tips of cleithra more or less free; dorsal with about 76, anal with about 52 rays . . . . . 27. *Bythites*.

mm. Head low, more or less depressed; tips of cleithra firmly united; dorsal with more than 90, anal with more than 70 rays . . . 28. *Catætyx*.

jj. No vomerine teeth; pelvic fins very small; margin of operculum with two weak spines; some spines on præinterorbital region . . . . . 29. *Bathystorreus*.

hh. No palatine teeth; lateral line double, not very distinct; margin of præoperculum firm, with one or two feeble, pointed processes . . . . . 30. *Grammonus*.

gg. Lateral line broad anteriorly, becoming narrow posteriorly, with a series of enlarged plate-like scales as in *Lamprogrammus*; tail long, tapering; a pair of canine teeth in upper jaw . 31. *Hypopleuron*.

ff. Pelvic fins absent.

n. Head normal; cheeks and opercles scaled; margin of præoperculum with 5 spines; two flap-like pyloric appendages; lateral line double, not conspicuous . . . . . 32. *Xenobythites*.

nn. Head greatly dilated, covered with a thick, gelatinous, scaleless skin; no pyloric appendages; lateral line indistinguishable . 33. *Hephthocara*.

ee. Head completely naked; margin of præoperculum without spines; pelvic fins, if present, of small or moderate size.

o. Tail short, not tapering; lateral line distinct . . 34. *Myxocephalus*.

oo. Tail of moderate length, tapering; lateral line absent, indistinct, or incomplete.

p. Pelvic fins present.

q. Scales on body imbricated; none of the teeth enlarged 35. *Diplacanthopoma*.

qq. Scales on body not or scarcely imbricated; some of the teeth enlarged . . . . . 36. *Saccogaster*.

pp. Pelvic fins absent . . . . . 37. *Pseudonus*.

BB. Body naked, or with minute scattered scales; lateral line absent. Some of the species perhaps representing post-larval forms.*

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* The grouping together of the Brotulids without scales is a convenient one but is far from satisfactory. Most of the genera in this group are imperfectly known, and their true position in the family almost impossible to determine. Apart from the absence of scales, such forms as *Pyramodon* and *Snyderidia* appear to have much in common with some of the more generalized Brotulids such as *Neobythites*.

r. Body short or of moderate length, tail not tapering ; vent never very far in advance of middle of total length ; head and body almost without pigment (except in *Parabrotula*).

s. Pelvic fins present.

t. Origin of dorsal fin well in advance of that of anal, more or less above base of pectoral.

u. Eyes present, small ; operculum with a single strong spine ; pelvic fins of moderate size ; mouth very oblique . . . 38. *Spectrunculus.*

uu. Eyes absent or hidden beneath the skin ; operculum without spine ; pelvic fins rather small.

v. Pectoral fins normal ; teeth small, few, absent in upper jaw; lower jaw included . . . . . 39. *Aphyonus.*

vv. Pectoral fins narrow pedicillate ; teeth in villiform bands in both jaws ; lower jaw a little projecting . . . . 40. *Sciadonus.*

tt. Origin of dorsal fin very little in advance of that of anal, well behind pectoral ; eyes visible through the skin ; mouth oblique . . . 41. *Barathronus.*

ss. Pelvic fins absent.

w. Eyes scarcely apparent ; head and body little pigmented ; origin of dorsal fin in advance of that of anal, just behind level of tip of pectoral 42. *Leucochlamys.*

ww. Eyes well developed ; head and body black ; origin of dorsal fin nearly above that of anal, well behind level of tip of pectoral . . 43. *Parabrotula.*

rr. Body elongate, compressed, tail tapering ; vent always well in advance of middle of total length ; head and body pigmented.

x. Vent well behind level of tip of pectoral fin ; pectorals very small ; no enlarged canine teeth ; pelvic fins absent . . . . . 44. *Brotulotænia.*

xx. Vent below level of middle or proximal part of pectoral fin ; pectorals large, nearly as long as head ; canine teeth present.

y. Pelvic fins present . . . . . 45. *Pyramodon.*

yy. Pelvic fins absent . . . . . 46. *Snyderidia.*

AA. Snout and lower jaw with well-developed barbels ; pelvic rays bifid . . [*Brotula*].

II. Cleithra greatly produced, meeting below eyes ; pelvics inserted below eyes.

w. Margin of præoperculum without spines.

x. Pelvic fins each of a simple ray . . . . . [*Sirembo*].

xx. Pelvic fins each of two bifid rays . . . . . 47. *Cherublemma.*

ww. Margin of præoperculum with 3 spines at angle ; each pelvic fin of a single bifid ray [*Hoplobrotula*].

1. *Neobythites*, Goode & Bean.

1886, Proc. U.S. Nat. Mus. VIII (1885), p. 600. Type : *N. gillii*, Goode & Bean.
[*Tetranematopus*, Günther, 1887, Deep-sea Fish. " Challenger ", p. 100. MS.]
Watasea, Jordan & Snyder, 1901, Proc. U.S. Nat. Mus. XXIII (1900), p. 765. Type : *W. sivicola*, Jordan & Snyder.

N. gillii, Goode& Bean.*
N. marginatus, Goode & Bean.
N. macrops, Günther.*
N. steatiticus, Alcock.*
N. sivicola (Jordan & Snyder).
N. longipes, Smith & Radcliffe.*
N. unimaculatus, Smith & Radcliffe.

N. purus, Smith & Radcliffe.
N. fasciatus, Smith & Radcliffe.*
N. analis, Barnard.*
N. phyllosoma, Parr.
N. nigromaculatus, Kamohara.
[*N. crassus* (Vaillant).]

2. *Homostolus*, Smith & Radcliffe.

1913, in Radcliffe, Proc. U.S. Nat. Mus. XLIV, p. 146. Type: *H. acer*, Smith & Radcliffe.

H. acer, Smith & Radcliffe.

3. *Monomitopus*, Alcock.

1890, Ann. Mag. Nat. Hist. (6) VI, p. 297. Type: *Sirembo nigripinnis*, Alcock.
Dicromita, Goode & Bean, 1895, Ocean. Ichth. p. 319. Type: *D. agassizii*, Goode & Bean.

M. nigripinnis (Alcock).*
M. conjugator (Alcock).* [=*M. pallidus*, Smith & Radcliffe].*
M. agassizii (Goode & Bean).
M. metriostoma (Vaillant).
M. torvus, Garman.
M. pallidus, Smith & Radcliffe.*
M. longiceps, Smith & Radcliffe.
M. microlepis, Smith & Radcliffe.*
M. kumæ, Jordan & Hubbs.

4. *Monomeropus*, Garman.

1899, Mem. Mus. Comp. Zoöl. XXIV, p. 158. Type: *M. malispinosus*, Garman.

M. malispinosus, Garman.
M. garmani, Smith & Radcliffe.*

5. *Dicrolene*, Goode & Bean.

1883, Bull. Mus. Comp. Zoöl. X, p. 202. Type: *D. introniger*, Goode & Bean.
Pteroidonus, Günther, 1887, Deep-sea Fish. "Challenger", p. 106. Type: *P. quinquarius*, Günther.
Paradicrolene, Alcock, 1889, Ann. Mag. Nat. Hist. (6) IV, p. 387. Type: *P. multifilis*, Alcock.

D. introniger, Goode & Bean.*
D. multifilis (Alcock).*
D. quinquarius (Günther).*
D. filamentosus, Garman.
D. nigra, Garman.
D. pullata, Garman.
D. longimana, Smith & Radcliffe.*
D. tristis, Smith & Radcliffe.
D. gregoryi, Trotter.
D. nigricaudis (Alcock).*
D. hubrechti, Weber.

The only difference between *Pteroidonus quinquarius* and typical species of *Dicrolene* lies in the somewhat smaller eye and simple pelvic rays of the former. Each of these rays consists of two rays

bound closely together with membrane, and these may be readily separated with a needle. Garman has described the same form of pelvic ray in *Dicrolene filamentosa*.

A new subgenus may be erected for *Dicrolene nigricaudis*, Alcock, for which the name **Brachydicrolene** is proposed. This may be distinguished by the shorter, deeper body, less tapering tail, more distinct lateral line, and the lower filamentous rays of the pectoral fin connected by membrane basally. *D. hubrechti*, Weber, is probably referable to this subgenus.

6. *Selachophidium*, Gilchrist.

1903, Mar. Invest. S. Afr. II, p. 209. Type: *S. guentheri*, Gilchrist.

S. guentheri, Gilchrist.*

7. *Benthocometes*, Goode & Bean.

1895, Ocean. Ichth. p. 327. Type: *Neobythites robustus*, Goode & Bean.

B. robustus (Goode & Bean).*
B. muraenolepis (Vaillant).

8. *Barathrodemus*, Goode & Bean.

1883, Bull. Mus. Comp. Zoöl. X, p. 200. Type: *B. manatinus*, Goode & Bean.

B. manatinus, Goode & Bean.*
B. nasutus, Smith & Radcliffe.*
B. microps, Parr.

9. *Barathrites*, Zugmayer.

1911, Bull. Inst. océan. Monaco, No. 193, p.11. Type: *B. iris*, Zugmayer.

B. iris, Zugmayer.
B. abyssorum, Roule.

10. *Bassogigas*, Goode & Bean.

1895 (*ex* Gill MS.), Ocean. Ichth. p. 328. Type: *Neobythites pterotus*, Alcock.
Holcomycteronus, Garman, 1899, Mem. Mus. Comp. Zoöl. XXIV, p. 162. Type: *H. digittatus*, Garman.

B. pterotus (Alcock).*
B. gillii, Goode & Bean.
B. stelliferoides (Gilbert).*
B. grandis (Günther).*
B. brucei (Dollo).*
B. digittatus (Garman).*
B. æquatoris, Smith & Radcliffe.

Alcock has indicated that in the type species of this genus (*B. pterotus*) the rays of the pelvic fins have spathulate tips in the males. This is the condition shown in Garman's figure of *Holcomycteronus digittatus*, but in his description he states that these rays vary "from somewhat inflated and blunt to acuminate or filamentary at the ends". In *B. pterotus*, *B. brucei*, *B. stelliferoides*, *B. digittatus* and *B. æquatoris* the pectoral fins are long and feathery in form, and in the first of these species at least they are longer in the males than in the females. *B. grandis* and *B. gillii* have shorter, rounded pectoral fins, but otherwise appear to be congeneric with the above-mentioned species.

11. *Bassobythites*, Brauer.

1906, " Valdivia " Tiefsee-Fische, p. 307. Type : *B. brunswigi*, Brauer.

B. brunswigi, Brauer.*

12. *Alcockia*, Goode & Bean.

1895, Ocean. Ichth. p. 329. Type : *Porogadus rostratus*, Günther.

A. rostratus (Günther).*

13. *Bassozetus*, Gill.

Bathynectes (part), Günther, 1878, Ann. Mag. Nat. Hist. (5) II, p. 20.
Bassozetus, Gill, 1884, Proc. U.S. Nat. Mus. VI (1883), p. 259. Type : *B. normalis*, Gill.
? *Pterodicromita*, Fowler, 1925, Amer. Mus. Novit. No. 162, p. 5. Type : *Sirembo oncerocephalus*, Vaillant.

B. normalis, Gill.*
B. compressus (Günther).*
B. tænia (Günther).*
B. glutinosus (Alcock).*
B. nasus, Garman.
[*B. oncerocephalus* (Vaillant).]

It is possible that *Sirembo oncerocephalus*, Vaillant, the type of Fowler's subgenus *Pterodicromita*, belongs here.

14. *Eretmichthys*, Garman.

1899, Mem. Mus. Comp. Zoöl. XXIV, p. 164. Type : *E. pinnatus*, Garman.

E. pinnatus, Garman.
E. remifer, Smith & Radcliffe.
[*E. ocella*, Garman.]

15. *Porogadus*, Goode & Bean.

1886, Proc. U.S. Nat. Mus. VIII (1885), p. 602. Type : *P. miles*, Goode & Bean.
Bathyonus, Goode & Bean, 1886, *t.c.*, p. 603. Type : *B. catena*, Goode & Bean.
Dermatorus, Alcock, 1890, Ann. Mag. Nat. Hist. (6) VI, p. 298. Type : *D. trichiurus*, Alcock.
Celema, Goode & Bean, 1895, Ocean. Ichth. p. 329. Type : *Porogadus nudus*, Vaillant.
Mœbia, Goode & Bean, 1895, *t.c.*, p. 331. Type : *Bathynectes gracilis*, Günther.
? *Penopus*, Goode & Bean, 1895, *t.c.*, p. 335. Type : *P. macdonaldi*, Goode & Bean.

P. catena (Goode & Bean).
P. miles, Goode & Bean.*
P. gracilis (Günther).*
P. trichiurus (Alcock).*
P. melanocephalus (Alcock).*
P. melampeplus (Alcock).
P. nudus, Vaillant.
P. subarmatus, Vaillant.*
P. longiceps, Garman.
P. atripectus, Garman.
P. breviceps, Garman.
P. promelas, Gilbert.
P. guentheri, Jordan & Fowler.
[*P. macdonaldi* (Goode & Bean).]
[*P. microphthalmus* (Vaillant).]

The genus *Porogadus* as here understood includes a number of forms which I regard as congeneric, although these have been distributed among several genera by Goode and Bean and others. The form of the head and operculum as well as the general physiognomy is more or less the same in all, and the alleged generic differences are concerned mainly with the form of the pelvic rays, the presence or absence of spines on the head, and the nature of the lateral line. The difference between a simple or a bifid pelvic ray in this group of species seems to me to be of comparatively little importance, a so-called simple ray merely consisting of two rays bound together for the whole of their length, and a bifid ray consisting of two rays bound together for a greater or lesser distance at their proximal ends. The presence or absence of spines on the head region is, to some extent at least, dependent upon the manner in which the fish is preserved, or the degree to which it has been damaged during capture; this is certainly a character of comparatively minor importance. In most of the specimens of this genus that I have examined the scales have all been rubbed off, and no trace of any lateral line is apparent; in one or two there are faint traces of the three rows of pores described in *P. miles*, *P. macdonaldi*, *P. longiceps*, *P. atripectus* and *P. breviceps*. It seems probable that all the species of the genus have this triple row of pores, and that it is due to the poor state of a particular specimen that the lateral line has been so frequently described as "indistinguishable" or "not apparent".

It is possible that *Penopus* should rank as a distinct genus, but there are few obvious characters to distinguish it from *Porogadus*. *Sirembo microphthalmus*, Vaillant, appears to be closely related to *Penopus macdonaldi*, Goode & Bean.

16. *Mixonus*, Günther.

Bathynectes, Günther, 1878, Ann. Mag. Nat. Hist. (5) II, p. 20. Type: *B. laticeps*, Günther. Not *Bathynectes*, Stimpson, 1870.
Mixonus, Günther, 1887, Deep-sea Fish. "Challenger", p. 108. Type: *Bathynectes laticeps*, Günther.
Nematonus, Günther, 1887, *t.c.*, p. 114. Type: *Bathyonus pectoralis*, Goode & Bean.

M. pectoralis (Goode & Bean).
M. laticeps (Günther).*
M. caudalis, Garman.

Günther describes each pelvic ray of *Mixonus laticeps* as consisting of "two rays firmly bound together in their whole length". In the type-specimen this description may be applied to one of the fins, but in the other the rays are more or less separate. Since the only important difference between *Mixonus* and *Nematonus* lies in the possession of simple and bifid pelvic rays respectively, there would seem to be little reason for maintaining the two genera as distinct.

17. *Mastigopterus*, Smith & Radcliffe.

1913, in Radcliffe, Proc. U.S. Nat. Mus. XLIV, p. 158. Type: *M. imperator*, Smith & Radcliffe.
? *Grimaldichthys*, Roule, 1913, Bull. Inst. océan. Monaco, No. 261, p. 2. Type: *G. profundissimus*, Roule.

M. imperator, Smith & Radcliffe.
M. prætor, Smith & Radcliffe.
[*M. profundissimus* (Roule).]
[*M. squamosus* (Roule).]

18. *Leucicorus*, Garman.

1899, Mem. Mus. Comp. Zoöl. XXIV, p. 146. Type: *L. lusciosus*, Garman.

L. lusciosus, Garman.

19. *Enchelybrotula*, Smith & Radcliffe.

1913, *t.c.*, p. 154. Type: *E. paucidens*, Smith & Radcliffe.

E. paucidens, Smith & Radcliffe.

20. *Glyptophidium*, Alcock.

1889, Ann. Mag. Nat. Hist. (6) IV, p. 390. Type: *G. argenteum*, Alcock.

G. argenteum, Alcock.*
G. macropus, Alcock.*
G. lucidum, Smith & Radcliffe.*
G. oceanium, Smith & Radcliffe.*
G. japonicum, Kamohara.
G. longipes, sp. n.*

21. *Lamprogrammus*, Alcock.

1891, Ann. Mag. Nat. Hist. (6) VIII, p. 32. Type: *L. niger*, Alcock.

L. niger, Alcock.*
L. fragilis, Alcock.*
L. illustris, Garman.
L. macropterus, Smith & Radcliffe.

22. *Acanthonus*, Günther.

1878, Ann. Mag. Nat. Hist. (5) II, p. 22. Type: *A. armatus*, Günther.

A. armatus, Günther.*
A. spinifer, Garman.

23. *Tauredophidium*, Alcock.

1890, Ann. Mag. Nat. Hist. (6) VI, p. 212. Type: *T. hextii*, Alcock.

T. hextii, Alcock.*

24. *Typhlonus*, Günther.

1878, Ann. Mag. Nat. Hist. (5) II, p. 21. Type: *T. nasus*, Günther.

T. nasus, Günther.*

25. *Pycnocraspedum*, Alcock.

1889, Ann. Mag. Nat. Hist. (6) IV, p. 386. Type: *P. squamipinne*, Alcock.

P. squamipinne, Alcock.*

It is possible that this genus really belongs to the oviparous group of Brotulids, but the reduction of the gill-rakers to 4 or 5 long ones near the angle of the arch suggests that it should be placed here. In general *Pycnocraspedum* is not unlike *Luciobrotula*, which is included by Smith and Radcliffe among the viviparous forms.

26. *Luciobrotula*, Smith & Radcliffe.

1913, in Radcliffe, Proc. U.S. Nat. Mus. XLIV, p. 170. Type: *L. bartschi*, Smith & Radcliffe.

L. bartschi, Smith & Radcliffe.*

27. *Bythites*, Reinhardt.

(1835) Overs. K. Danske Vid. Selsk. Forh. (1832–36), p. lxxviii; 1838, Afhandl. K. Danske Vid. Selsk. VII, p. 178. Type: *B. fuscus*, Reinhardt.

B. fuscus, Reinhardt.
B. lepidogenys, Smith & Radcliffe.

28. *Catœtyx*, Günther.

1887, Deep-sea Fish. " Challenger ", p. 104. Type: *Sirembo messieri*, Günther.

C. messieri (Günther).*
C. rubrirostris, Gilbert.
C. simus, Garman.
C. squamiceps (Lloyd).*
C. platycephalus, Smith & Radcliffe.
C. alleni (Byrne).*

29. *Bathystorreus*, Rivero.

1934, Mem. Soc. Cubana Hist. Nat. VIII (2), p. 69. Type: *Benthocometes claudei*, Torre.

B. claudei (Torre).

30. *Grammonus*, Goode & Bean.

Gadopsis, Filippi, 1856, Zeitschr. wiss. Zool. VII, p. 170. Type: *Oligopus ater*, Risso. Not *Gadopsis*, Agassiz, 1845, or *Gadopsis*, Richardson, 1848.
Pteridium, Filippi & Verany, 1859, Mem. Acad. Sci. Torino, (2) XVIII, p. 195. Type: *Oligopus ater*, Risso. Not *Pteridium*, Scopoli, 1777.
Grammonus, Goode & Bean (*ex* Gill MS.), 1895, Ocean. Ichth. p. 317. Type: *Oligopus ater*, Risso.
Verater, Jordan, 1919, Genera Fish. II, p. 365; Proc. Acad. N.S. Philad. LXX, p. 343. Type: *Oligopus ater*, Risso.

G. ater (Risso).*
G. armatus (Döderlein).
G. robustus, Smith & Radcliffe.
G. opisthodon, J. L. B. Smith.

31. *Hypopleuron*, Smith & Radcliffe.

1913, in Radcliffe, Proc. U.S. Nat. Mus. XLIV, p. 164. Type: *H. caninum*, Smith & Radcliffe.

H. caninum, Smith & Radcliffe.*

32. *Xenobythites*, Smith & Radcliffe.

1913, *t.c.*, p. 173. Type: *X. armiger*, Smith & Radcliffe.

X. armiger, Smith & Radcliffe.*

33. *Hephthocara*, Alcock.

1892, Ann. Mag. Nat. Hist. (6) X, p. 349. Type: *H. simum*, Alcock.

H. simum, Alcock.
H. crassiceps, Smith & Radcliffe.*

34. *Myxocephalus*, Steindachner & Döderlein.

1887, Denkschr. Akad. wiss. Wien, LIII, p. 281. Type: *M. japonicus*, Steindachner & Döderlein.

M. japonicus, Steindachner & Döderlein.

35. *Diplacanthopoma*, Günther.

1887, Deep-sea Fish. "Challenger", p. 115. Type: *D. brachysoma*, Günther.
Sarcocara, Smith & Radcliffe, 1913, in Radcliffe, Proc. U.S. Nat. Mus. XLIV, p. 167. Type: *Diplacanthopoma brunnea*, Smith & Radcliffe.

D. brachysoma, Günther.*
D. raniceps, Alcock.*
D. rivers-andersoni, Alcock.
D. alcockii, Goode & Bean.
D. brunnea, Smith & Radcliffe.*
D. nigripinnis, Gilchrist & von Bonde.

36. *Saccogaster*, Alcock.

1889, Ann. Mag. Nat. Hist. (6) IV, p. 389. Type: *S. maculatus*, Alcock.

S. maculatus, Alcock.*

37. *Pseudonus*, Garman.

1899, Mem. Mus. Comp. Zoöl. XXIV, p. 169. Type: *P. acutus*, Garman.

P. acutus, Garman.

38. *Spectrunculus*, Jordan & Thompson.

1914, Mem. Carnegie Mus. VI, p. 301. Type: *S. radcliffei*, Jordan & Thompson.

S. radcliffei, Jordan & Thompson.

This genus is perhaps based upon a post-larval fish. The unique type is only 64 mm. in total length.

39. *Aphyonus*, Günther.

1878, Ann. Mag. Nat. Hist. (5) II, p. 22. Type: *A. gelatinosus*, Günther.

A. gelatinosus, Gunther.*
A. mollis, Goode & Bean.

40. *Sciadonus*, Garman.

1899, Mem. Mus. Comp. Zoöl. XXIV, p. 171. Type: *S. pedicellaris*, Garman.

S. pedicellaris, Garman.

41. *Barathronus*, Goode & Bean.

1885, Bull. Mus. Comp. Zoöl. XII, p. 164. Type: *B. bicolor*, Goode & Bean.
Alexeterion, Vaillant, 1888, Exped. Sci. "Travailleur" et "Talisman", Poiss., p. 282. Type: *A. parfaiti*, Vaillant.

B. bicolor, Goode & Bean.*
B. parfaiti (Vaillant).
B. diaphanus, Brauer.
B. affinis, Brauer.

42. *Leucochlamys*, Zugmayer.

1911, Bull. Inst. océan. Monaco, No. 193, p. 11. Type : *L. cryptophthalmus*, Zugmayer.

L. cryptophthalmus, Zugmayer.

43. *Parabrotula*, Zugmayer.

1911, *t.c.*, p. 10. Type : *P. plagiophthalmus*, Zugmayer.

P. plagiophthalmus, Zugmayer.
P. dentiens, Beebe.

44. *Brotulotænia*, Parr.

1933, Bull. Bingham Ocean. Coll. III (6), p. 48. Type : *B. nigra*, Parr.

B. nigra, Parr.
B. crassa, Parr.

45. *Pyramodon*, Smith & Radcliffe.

1913, in Radcliffe, Proc. U.S. Nat. Mus. XLIV, p. 175. Type : *P. ventralis*, Smith & Radcliffe.
Cynophidium, Regan, 1914, Ann. Mag. Nat. Hist. (8) XIII, p. 16. Type : *C. punctatum*, Regan.

P. ventralis, Smith & Radcliffe.
P. punctatus (Regan).*

Regan (1914, ' Brit. Antarct. [" Terra Nova "] Exped.' Zool. I, No. 1, p. 20) has pointed out that *Pyramodon* and *Snyderidia* should be placed in the family Brotulidæ, although in many respects they seem to approach the Fierasferidæ.

46. *Synderidia*, Gilbert.

1905, Bull. U.S. Fish. Comm. XXIII (1903), p. 654. Type : *S. canina*, Gilbert.

S. canina, Gilbert.

47. *Cherublemma*, Trotter.

1926, Zoologica N.Y. VIII, p. 119. Type : *C. lelepris*, Trotter.

C. lelepris, Trotter.

Family Stromateidæ.

Psenes arafurensis, Günther.

Psenes arafurensis, Günther, 1889, Pelagic Fish. " Challenger ", p. 13, pl. ii, fig. c ; Regan, 1902, Ann. Mag. Nat. Hist. (7) X, p. 126.

Occurrence :

? St. 96, Arabian Sea, N. 200, 400–645 m. ; 1 (23 mm.), in poor condition.

St. 99, Arabian Sea, hand-net, surface ; 8 (17–35 mm.), associated with medusæ (*Aurelia ?*).

St. 101, Arabian Sea, hand-net, surface ; 1 (25 mm.).

Distribution.—Arabian Sea, Arafura Sea.

Psenes guttatus, Fowler.

Psenes guttatus, Fowler, 1934, Proc. Acad. Nat. Sci. Philad. LXXXVI, p. 442, fig. 24.

Occurrence :

St. —— (extra), South Arabian Coast, NHS, surface ; 1 (30 mm.).

St. 75, Gulf of Oman, OT, 201 m. ; 1 (52 mm.).

Distribution.—Natal, Coast of Arabia, Gulf of Oman.

Remarks.—These two small specimens appear to be referable to Fowler's species, known only from the type, 60 mm. in length, from Natal.

Cubiceps sp.

Occurrence :

St. 76, Gulf of Oman, N. 200, 2500 m. ; 1 (28 mm.).

Family Scorpænidæ.

Setarches marleyi, Fowler.

Setarches marleyi, Fowler, 1935, Proc. Acad. Nat. Sci. Philad. LXXXVII, p. 398, figs. 28, 29.

Occurrence :

St. 115, Zanzibar area, OT, 640–658 m. ; 38 (155–240 mm.).

St. 122, Zanzibar area, OT, 732 m. ; 4 (240–300 mm.).

Distribution.—East coast of Africa, Indian Ocean and Archipelago (?) ; in deep water.

Remarks.—I have identified these specimens with Fowler's species, since they seem to agree very well with his description and figure. The material described by Alcock (1899, ' Cat. Indian Deep-sea Fish.' p. 28) as *S. guentheri*, from the Bay of Bengal and the Andaman Sea, and the single specimen believed to be from Natal described by Smith (1934, ' Trans. R. Soc. S. Afr.', XXII, p. 97, pl. vi *c*) as *S. guentheri*, probably belong to the same species. It seems possible that there is only one species in the Indo-Pacific, and that the forms described as *Lioscorpius longiceps*, Günther, from the Philippines and Kei Islands, *Setarches fidjiensis*, Günther, from off Matuku, Fiji, and *S. remigera* (Gilbert & Cramer), from the Hawaiian Islands, are all identical. This species, which would bear the name *Setarches longiceps* (Günther), is very closely related to *S. guentheri*, Johnson, from the Atlantic (of which *S. parmatus*, Goode, appears to be a synonym), differing in the lower spinous dorsal fin, rather shorter maxillary, the shape of the occipital fontanel, and in other minor characters.

A coloured sketch made of the fresh fish shows this to have been bright red.

Scorpænopsis cirrhosa (Thunberg).

Occurrence :

St. 27, Gulf of Aden, OT, 37–91 m. ; 2 (54, 150 mm.).

Distribution.—East Africa and the Red Sea, through the Indian Ocean and Archipelago, to Japan and the Pacific.

Phenacoscorpius adenensis, sp. n.

Occurrence :

St. 177, Gulf of Aden, AT, 274–366 m. ; 1 (100 mm.). Holotype.

Distribution.—Gulf of Aden ; in deep water.

Description.—Depth of body about $2\frac{2}{3}$ in the length, length of head $2\frac{1}{4}$. Snout rather shorter than eye, diameter of which is more than twice the interorbital width and $3\frac{1}{2}$ in length of head. Cheeks, opercles and occiput with ctenoid scales ; a few scales present also on the concave interorbital space. No occipital pit. A short spine above the nostrils and a row of 4 or 5 above the orbit, of which the hindmost is longer and stronger than the remainder ; a pair of spines bordering the occipito-nuchal region ; 2 short, broad præorbital spines and a series of about 6 spines on the suborbital ridge ; 4 spines on the margin of the præoperculum, the uppermost strongest and bearing a second spine at its base ;

Text-fig. 29.—*Phenacoscorpius adenensis*. Holotype. × 1.

2 spines on the operculum, and a series of 2 or 3 from eye to upper angle of gill-opening. Head with a number of large pores, but without membranous processes ; a row of 3 simple membranous filaments above the eye. Maxillary extending to a little beyond level of middle of eye. Teeth in villiform bands in jaws and on vomer and palatines ; palatine band short, its length about $\frac{1}{4}$ diameter of eye. 14 gill-rakers on lower part of anterior arch. Scales ctenoid ; 6 or 7 between first dorsal spine and commencement of lateral line ; breast scaled ; no membranous processes or filaments on body. Lateral line represented by about 5 tubular scales. Dorsal XII 9 ; third spine longest, $2\frac{1}{3}$ in length of head. Anal III 5 ; second spine much longer and stronger than third. Pectoral with 17 rays ; lower 11 rays simple, somewhat thickened, free at their tips, some of them produced beyond the upper branched rays ; uppermost 2 or 3 rays also simple ; lowermost ray inserted above level of root of pelvic spine and about opposite uppermost ; fin extending to above origin of anal, its length about $\frac{2}{3}$ that of head. Uniformly pale yellowish-brown.

Remarks.—This fish appears to be congeneric with that recently described by Fowler (1938, 'Proc. U.S. Nat Mus.' LXXXV, p. 70, fig. 30) as *Phenacoscorpius megalops*, from the Philippines and East Indies, at depths ranging from 68 to 622 metres. It may be readily

distinguished from Fowler's species by the deeper body, different form of the præopercular spines, and by the presence of teeth on the palatines.

Dendrochirus brachypterus (Cuvier & Valenciennes).

Occurrence :

St. 27, Gulf of Aden, OT, 37–91 m. ; 1 (70 mm.).

Distribution.—East Africa and the Red Sea, through the Indian Ocean and Archipelago, to Australia and the Pacific.

Pterois antennata (Bloch).

Occurrence :

St. 45, South Arabian coast, TD 4, 38 m. ; 1 (190 mm.).

Distribution.—Indian Ocean and Archipelago.

Pterois sp.

Occurrence :

St. 7, Red Sea, N 200, 100–0 m. ; 12 (14 to 19 mm.).

Snyderina guentheri (Boulenger).

Tetraroge guentheri, Boulenger, 1889, Proc. Zool. Soc. p. 239, pl. xxv ; 1901, Ann. Mag. Nat. Hist. (7) VII, p. 262.

Occurrence :

St. 24, Gulf of Aden, OT, 73–200 m. ; 5 (65–190 mm.).

Distribution.—Gulf of Aden, Gulf of Oman.

Description.—Depth of body $2\frac{3}{4}$ in the length, length of head about $2\frac{1}{2}$. Diameter of eye a little greater than interorbital width, 4 (young) to nearly 5 in length of head ; maxillary extending to below level of middle of eye or not quite as far ; bands of villiform teeth in jaws and on vomer ; palatines toothless. 10 to 12 very short gill-rakers on lower part of anterior arch. Dorsal XIII 11–12 ; first spine short, above anterior part or middle of eye ; third longest, about $\frac{3}{5}$ length of head. Anal III 6. Pectoral with 13 rays, as long as or nearly as long as head, extending beyond origin of anal. Head and body usually with small round pale spots, separated by a dark network ; sometimes with scattered small dark brown spots ; generally a large dark brown spot behind upper part of gill-opening, and one or two smaller ones on sides of body in the region of the lateral line ; dark bars radiating from the eye, the most distinct of these running across the præorbital ; all the fins usually with closely-set round pale spots ; a round black blotch just behind middle of base of spinous dorsal.

Remarks.—Boulenger was in error in stating that the palatines are toothed in this species. *S. guentheri* is very closely related to *S. yamanokami*, Jordan & Starks, from Japan, but appears to differ in the size of the mouth, rather more numerous gill-rakers, longer dorsal and anal spines, etc.

Family Triglidæ.

Lepidotrigla omanensis, Regan.

Lepidotrigla omanensis, Regan, 1905, J. Bombay Nat. Hist. Soc. XVI, p. 324, pl. ii, fig. 2.

Occurrence :

St. 43, South Arabian Coast, OT, 83–100 m. ; 5 (20–43 mm.).

St. 194, Gulf of Aden, AT, 220 m. ; 105 (63–135 mm.).

Distribution.—Gulf of Aden, southern coast of Arabia, Gulf of Oman ; in deep water.

Remarks.—The form of the præorbital spines presents a good deal of variation in this species. It may be readily distinguished from *L. spiloptera*, Günther, however, by the absence of a keel on the lower margin of the præoperculum, as well as by the difference in the numbers of dorsal and anal fin-rays.

Lepidotrigla spiloptera, Günther.

Lepidotrigla spiloptera, Günther, 1880, Shore Fish. " Challenger ", p. 42, pl. xviii, fig. c ; 1887, Deep-sea Fish. " Challenger ", p. 64 ; Alcock, 1899, Cat. Indian Deep-sea Fish. p. 67 ; Weber, 1913, " Siboga "-Exped., Fishes, p. 511.

Lepidotrigla multispinosus, Smith, 1934, Trans. R. Soc. S. Afr. XXII, p. 326, pls. xvii, xx.

Occurrence :

St. 106, Zanzibar area, AT, 183–194 m. ; 7 (70–100 mm.).

Distribution.—Indian Ocean and Archipelago ; in deep water.

Trigla sp.

Occurrence :

St. 43, South Arabian Coast, OT, 83–100 m. ; 10 (17–25 mm.).

Peristedion adeni (Lloyd).

Occurrence :

St. 194, Gulf of Aden, AT, 220 m. ; 6 (115–185 mm.).

Distribution.—Coast of Natal, Gulf of Aden.

Peristedion investigatoris, Alcock.

Occurrence :

St. 115, Zanzibar area, OT, 640–658 m. ; 4 (190–230 mm.).

Distribution.—East coast of Africa, Travancore coast, Andaman Sea.

Family Synanciidæ.

Minous inermis, Alcock.

Occurrence :

St. 37, Gulf of Aden, OT, 18–22 m. ; 3 (43–48 mm.).

St. 194, Gulf of Aden, AT, 220 m. ; 16 (60–115 mm.).

Distribution.—Gulf of Aden, Gulf of Oman, off Coromandel coast, off Malabar coast.

Family Platycephalidæ.

Platycephalus townsendi, Regan.

Occurrence :

St. A, Red Sea, OT, 65–68 m. ; 1 (185 mm.).
St. 37, Gulf of Aden, OT, 18–22 m. ; 1 (117 mm.).
St. 43, South Arabian Coast, OT, 83–100 m. ; 1 (19 mm.).
St. 80, South Arabian Coast, SD 4, 16–22 m. ; 1 (41 mm.).

Distribution.—Red Sea, Gulf of Aden, coast of Arabia, Gulf of Oman, Karachi.

Platycephalus pristiger, Cuvier & Valenciennes.

Occurrence :

St. 37, Gulf of Aden, OT, 18–22 m. ; 2 (60, 64 mm.).
St. 72, Gulf of Oman, AT, 73 m. ; 4 (108–145 mm.).

Distribution.—Indian Ocean and Archipelago, Philippines.

Platycephalus nigripinnis, Regan.

Occurrence :

St. 72, Gulf of Oman, AT, 73 m. ; 10 (85–115 mm.).

Distribution.—Gulf of Oman.

Family Hoplichthyidæ.

Hoplichthys acanthopleurus, Regan.

Occurrence :

St. 106, Zanzibar area, AT, 183–194 m. ; 20 (95–145 mm.).
St. 107, Zanzibar area, AT, 421–457 m. ; 1 (115 mm.).

Distribution.—Indian Ocean.

Family Dactylopteridæ.

Dactyloptena orientalis (Cuvier & Valenciennes).

Occurrence :

St. 27, Gulf of Aden, OT, 37–91 m. ; 1 (83 mm.).
St. 37, Gulf of Aden, OT, 18–22 m. ; 1 (43 mm.).

Distribution.—Indo-Pacific.

Family Pegasidæ.

Pegasus draconis, Linnæus.

Occurrence :

St. 27, Gulf of Aden, OT, 37–91 m. ; 1 (46 mm.).

Distribution.—East Africa, through the Indian Ocean and Archipelago, to China.

Family Echeneididæ.

Leptecheneis naucrates (Linnæus).

Occurrence :

St. ——, Gulf of Aden, Oct. 11, 1933, hooked by member of crew ; 1 (420 mm.).

Distribution.—All warm seas.

Echeneis remora, Linnæus.

Occurrence :

St. ——, Arabian Sea, Dec. 23, 1933, attached to shark ; 1 (175 mm.).

St. 166, Arabian Sea, surface, from a shark ; 3 (145–180 mm.).

St. 170, Arabian Sea, taken on a shark ; 2 (145, 175 mm.).

Distribution.—All warm seas.

Family Bothidæ.

Pseudorhombus arsius (Hamilton).

Occurrence :

St. 37, Gulf of Aden, OT, 18–22 m. ; 1 (175 mm.).

Distribution.—East Africa, through the Indian Ocean and Archipelago, to the Pacific.

Tæniopsetta ocellata (Günther).

Occurrence :

St. 106, Zanzibar area, AT, 183–194 m. ; 2 (72, 97 mm.).

Distribution.—Near Zanzibar ; Saya de Malha Bank, Indian Ocean ; Admiralty Islands.

Citharoides macrolepis (Gilchrist).

Arnoglossus macrolepis, Gilchrist, 1905, Mar. Invest. S. Afr. III, p. 12, pl. xxxi ; von Bonde, 1925, Trans. R. Soc. S. Afr. XII, p. 288.

Paracitharus macrolepis, Regan, 1920, Ann. Durban Mus. II, p. 210, fig. 2 ; Barnard, 1925, Ann. S. Afr. Mus. XXI, p. 389 ; Fowler, 1926, Proc. Acad. N.S. Philad. LXXVII (1925), p. 203.

Citharoides macrolepis (part), Norman, 1934, Syst. Monogr. Flatfish. I, p. 170, fig. 122.

Occurrence :

St. 106, Zanzibar area, AT, 183–194 m. ; 19 (53–170 mm.).

Distribution.—South-east Africa, from near Zanzibar to Delagoa Bay.

Remarks.—In my monograph of the Flatfishes I regarded *Citharoides macrolepidotus*, Hubbs, originally described from a specimen 59 mm. in total length, as identical with *Arnoglossus macrolepis* of Gilchrist. Comparison of 10 specimens (135 to 245 mm.) from the east coast of Africa with one specimen (182 mm.) from the Sea of Japan, however, suggests that the Japanese species is distinct. In *C. macrolepis* the diameter of the eye is 4 to $4\frac{2}{3}$, the length of the upper jaw on the ocular side 2 to $2\frac{1}{6}$, and the length of the upper jaw on the blind side $2\frac{1}{8}$ to $2\frac{1}{4}$ in the length of the head (inclusive of the projecting lower jaw) ; in *C. macrolepidotus* the measurements are $5\frac{1}{4}$, $2\frac{2}{5}$ and $2\frac{1}{2}$ respectively.

Brachypleurops axillaris, Fowler, from the Philippines, is a member of this genus, and seems to be synonymous with *C. macrolepidotus*.

Arnoglossus tapeinosoma (Bleeker).

Occurrence :

St. 71, Gulf of Oman, OT, 106 m. ; 5 (68–77 mm.).

Distribution.—From the Persian Gulf to the Malay Peninsula and Archipelago and beyond.

Arnoglossus arabicus, sp. n.

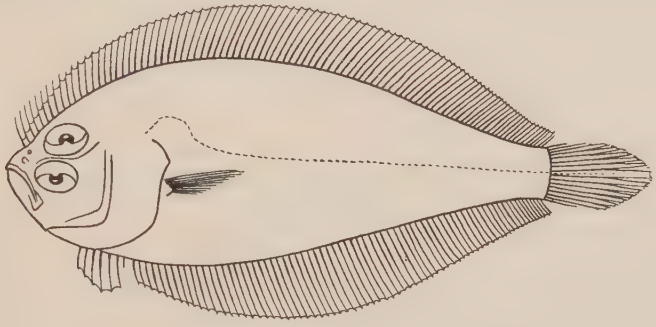
Occurrence :

St. 43, South Arabian Coast, OT, 83–100 m. ; 2 (63, 87 mm.). Holotype 87 mm.

St. 194, Gulf of Aden, AT, 220 m. ; 11 (73–105 mm.).

Distribution.—Gulf of Aden and the southern coast of Arabia.

Description.—Depth of body $2\frac{1}{2}$ to $2\frac{3}{4}$ in the length, length of head about $3\frac{1}{2}$. Snout shorter than eye, diameter of which is 3 to nearly $3\frac{3}{4}$ in length of head ; eyes separated



Text-fig. 30.—*Arnoglossus arabicus*. Holotype. × 1.

by a narrow bony ridge, the lower a little in advance of the upper. Maxillary extending to below anterior $\frac{1}{3}$ or $\frac{1}{2}$ of eye, length $2\frac{3}{4}$ to 3 in that of head ; lower jaw $2\frac{1}{8}$ to $2\frac{1}{3}$ in head. Teeth minute, those of upper jaw somewhat larger and wider apart anteriorly ; no distinct canines. 11 or 12 slender gill-rakers on lower part of anterior arch. Scales almost all missing, but apparently about 60 in a longitudinal series. Dorsal 96–102 ; origin just above posterior nostril of blind side and well in advance of eye. Anal 75–78. Pectoral of ocular side with 12 or 13 rays, its length about $\frac{1}{2}$ that of head. Caudal obtusely pointed (?). Yellowish-brown, without definite markings ; fins greyish.

Remarks.—Apparently most nearly related to *A. elongatus*, Weber, from the Madura Sea, differing mainly in the somewhat deeper body, smaller mouth, rather more numerous gill-rakers, and shorter anterior rays of dorsal fin. The two specimens from the south Arabian coast have a somewhat smaller eye, but are otherwise identical with those from the Gulf of Aden.

Arnoglossus dalgleishi (von Bonde).

Occurrence :

St. 106, Zanzibar area, AT, 183–194 m. ; 5 (157–185 mm.).

Distribution.—Natal, near Zanzibar.

Engyprosopon grandisquama (Temminck & Schlegel).

Occurrence :

St. 37, Gulf of Aden, OT, 18–22 m. ; 2 (73, 75 mm.).

Distribution.—East Africa, through the Indian Ocean and Archipelago, to Australia and Japan.

Engyprosopon latifrons (Regan).

Occurrence :

St. A, Red Sea, OT, 65–68 m. ; 2 male specimens (74, 79 mm.).

Distribution.—Red Sea, Indian Ocean.

Engyprosopon macrolepis (Regan).

Occurrence :

St. 27, Gulf of Aden, OT, 37–91 m. ; 1 male specimen (72 mm.).

Distribution.—Gulf of Aden ; Cargados Carajos, Indian Ocean.

Remarks.—This species was known previously from the unique holotype, a male, 60 mm. in total length.* The present example has the spines on the snout and in front of the eyes stronger, and the filamentous pectoral ray nearly twice as long as the head, but these differences may be due to age.

Bothus pantherinus (Rüppell).

Occurrence :

St. 37, Gulf of Aden, AT, 18–22 m. ; 1 (75 mm.).

Distribution.—East Africa, through the Indian Ocean and Archipelago, to Australia and the Pacific.

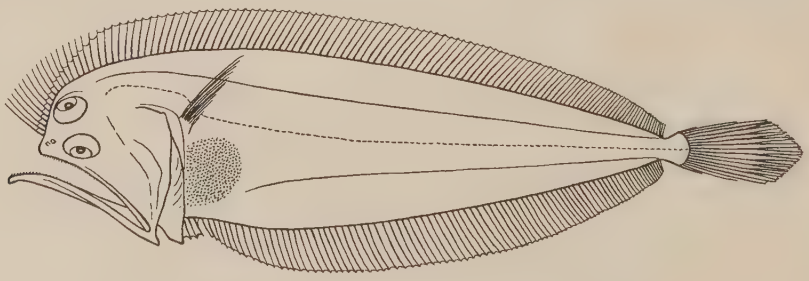
Chascanopsetta prognathus, sp. n.

Occurrence :

St. 145, Maldive area, AT, 494 m. ; 1 (200 mm.). Holotype.

Distribution.—Maldives.

Description.—Depth of body $3\frac{1}{2}$ in the length, length of head about $4\frac{2}{3}$. Diameter of eye $3\frac{4}{5}$ in length of head, more than 3 times interorbital width. Maxillary extending



Text-fig. 31.—*Chascanopsetta prognathus*. Holotype. × $\frac{1}{2}$.

nearly to edge of operculum, about as long as the head ; about $\frac{1}{5}$ of the length of the lower jaw projecting beyond the upper. Width of curve of lateral line about 6 in straight

* In the original description this length is erroneously given as 72 mm.

part. Dorsal 133. Anal 83. Pectoral of ocular side with 15 rays, length about $1\frac{3}{4}$ in that of head. Anterior ray of right pelvic inserted opposite space between second and third rays of left pelvic. Caudal pointed (?); caudal peduncle a little deeper than long. Pale brownish, without markings; median fins more or less dusky; anterior rays of dorsal pale.

Remarks.—This species differs from *C. lugubris*, Alcock, in the wider mouth, more projecting lower jaw and more numerous dorsal rays. In the form of the jaws *C. prognathus* approaches *Pelecanichthys crumenalis*, Gilbert & Cramer, from the Hawaiian Islands, but lacks the gular pouch of that genus.

Læops nigrescens, Lloyd.

Occurrence:

St. 194, Gulf of Aden, AT, 220 m.; 50 (90–145 mm.).

Distribution.—Gulf of Aden.

Family Pleuronectidæ.

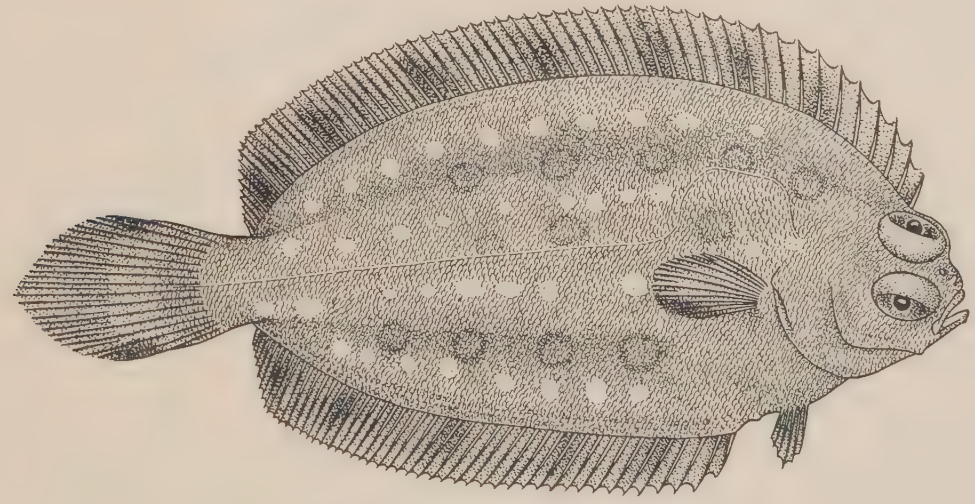
Pœcilopsetta albomaculata, sp. n.

Occurrence:

St. 153, Maldive area, TD 4, 256–293 m.; 3 (120–140 mm.). Holotype 130 mm.

Distribution.—Maldives.

Description.—Depth of body about $2\frac{1}{4}$ in the length, length of head 4. Snout much shorter than eye, diameter of which is $2\frac{4}{5}$ to 3 in length of head; eyes separated by a



Text-fig. 32.—*Pœcilopsetta albomaculata*. Holotype. × 1.

low, narrow, scaled ridge, the lower very little in advance of the upper, which enters the dorsal profile of the head. Maxillary extending to below anterior $\frac{1}{4}$ of eye, length $3\frac{3}{4}$ to 4 in that of head; lower jaw $2\frac{1}{2}$ to $2\frac{3}{4}$ in head. Teeth in bands in both jaws. 14 gill-rakers on lower part of anterior arch. Scales cycloid on both sides of body; about 140 in lateral line; width of curve of lateral line about 3 in straight part. Dorsal 60–61; origin behind middle of eye. Anal 51–53. Pectoral of ocular side with 12 rays, length $1\frac{3}{5}$ to $1\frac{3}{4}$ in

that of head ; length of pectoral of blind side about $2\frac{1}{2}$ in head. Caudal pointed ; caudal peduncle about twice as deep as long. Greyish-brown, with indications of 3 series of dark spots or rings, and with 4 series of smaller, rounded, white spots, one on either side of the straight portion of the lateral line and one near each edge of body ; smaller specimen with traces of the dark markings characteristic of the young of *P. colorata* and *P. prælonga* ; dorsal and anal fins greyish, the rays tipped with white, each fin with a series of dark blotches ; a pair of conspicuous black spots at middle of upper and lower margins of caudal fin ; lower part of pectoral with a deep black spot distally, which is more distinct on underside of fin ; in the two larger specimens the head is yellowish-white on the blind side, but the whole of the body and the median fins are blackish.

Remarks.—Related to *P. colorata*, Günther, differing mainly in the more slender body, smaller mouth, more numerous gill-rakers, smaller scales and in the coloration.

Pœcilopsetta zanzibarensis, sp. n.

Occurrence :

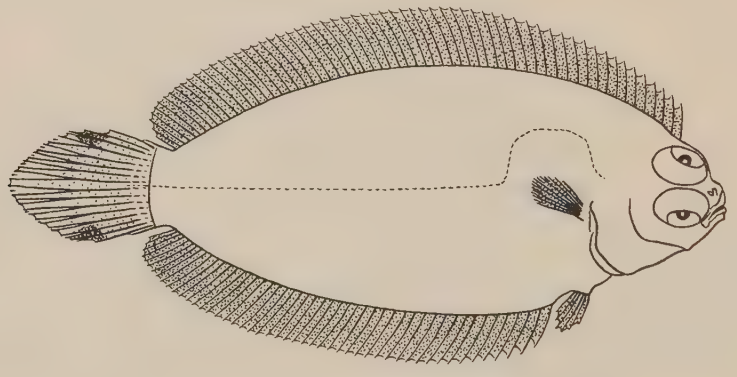
St. 105, Zanzibar area, AT, 238–293 m. ; 12 (90–125 mm.).

St. 106, Zanzibar area, AT, 183–194 m. ; 11 (88–130 mm.). Holotype 130 mm.

St. 107, Zanzibar area, AT, 421–457 m. ; 1 (88 mm.).

Distribution.—Near Zanzibar.

Description.—Depth of body $2\frac{1}{3}$ to nearly 3 in the length, length of head 4 to $4\frac{1}{2}$. Snout much shorter than eye, diameter of which is $2\frac{1}{4}$ (young) to $2\frac{1}{2}$ in length of head ; eyes nearly contiguous, the lower scarcely in advance of upper, which just enters the



Text-fig. 33.—*Pœcilopsetta zanzibarensis*. Holotype. × $\frac{3}{4}$.

dorsal profile of the head. Maxillary extending to a little beyond anterior margin of eye, length $3\frac{2}{3}$ to nearly 4 in that of head ; lower jaw $2\frac{1}{2}$ to 2 in head. Teeth in narrow bands in both jaws (at least in adults). 12 gill-rakers on lower part of anterior arch. Scales feebly ctenoid on ocular side, cycloid on blind side ; 95 to 100 in lateral line ; width of curve of lateral line $3\frac{1}{3}$ to $3\frac{3}{4}$ in straight part. Dorsal 60–64 ; origin a little behind middle of eye. Anal, 50–54. Pectoral of ocular side with 10 or 11 rays, length $2\frac{1}{5}$ to $2\frac{2}{5}$ in that of head ; length of pectoral of blind side 2 to $2\frac{1}{4}$ in head. Caudal pointed ; caudal peduncle about 4 times as deep as long. Pale brownish, without definite markings ; the blind side yellowish-white, with series of small black spots, which are more conspicuous in the young ; fins all more or less dusky or blackish, the dorsal and anal rays tipped

with white ; a pair of conspicuous black spots at middle of upper and lower margins of caudal fin.

Remarks.—Close to *P. prælonga*, Alcock, which has a more slender body, the lower eye distinctly in advance of the upper, a rather larger mouth, and the anterior curve of the lateral line wider (width about 3 in straight part). *P. natalensis*, Norman, may be distinguished by the larger scales and by the coloration.

Marleyella bicolorata (von Bonde).

Occurrence :

St. 106, Zanzibar area, AT, 183–194 m. ; 4 (96–125 mm.).

Distribution.—Natal, near Zanzibar.

Marleyella maldivensis, sp. n.

Occurrence :

St. 157, Maldive area, TD 4, 229 m. ; 2 (98, 132 mm.). Holotype, a female, 132 mm.

Distribution.—Maldives.

Description.—Depth of body $2\frac{3}{5}$ to $2\frac{4}{5}$ in the length, length of head $3\frac{1}{8}$ to $3\frac{1}{4}$. Snout much shorter than eye, diameter of which is 3 to nearly $3\frac{1}{4}$ in length of head ; eyes separated

Text-fig. 34.—*Marleyella maldivensis*. Holotype. × 1.

by a very narrow ridge, which has a few scales in its anterior part ; lower eye scarcely in advance of upper, which enters the dorsal profile of the head. A blunt bony prominence on snout in front of the anterior nostril. Maxillary extending to below anterior $\frac{1}{4}$ of eye,

length $2\frac{1}{2}$ in that of head. Teeth in narrow bands in both jaws. 15 gill-rakers on lower part of anterior arch. Scales feebly ctenoid on ocular side, cycloid on blind side ; about 80 in lateral line ; width of curve of lateral line $2\frac{1}{4}$ to $2\frac{2}{5}$ in straight part. Dorsal 58–59 ; origin above posterior part of eye ; second and third, or second, third and fourth rays prolonged, the length of the second ray $1\frac{1}{4}$ (smaller specimen) to $1\frac{1}{2}$ times length of head. Anal 49–50. Pectoral of ocular side with 13 or 14 rays, the middle ones branched, length $1\frac{3}{4}$ in that of head ; length of pectoral of blind side more than twice in head. Pelvic of ocular side with the second ray prolonged, its length (in the holotype) about equal to that of head. Caudal pointed ; caudal peduncle about twice as deep as long. Greyish-brown, with darker blotches which tend to form very irregular cross-bars on the body ; body with a number of small round, white spots ; blind side yellowish anteriorly, more or less pigmented posteriorly, especially towards edges of body ; a black blotch on the blind side of the head just in front of the dorsal fin ; median fins greyish, the rays of the dorsal and anal tipped with white, each fin with a row of dark spots ; a round black spot on middle of basal part of caudal ; pectoral dusky, lower part of fin with a black spot distally, which is more distinct on the underside ; pelvic dusky, distal parts of second and third rays pale.

Remarks.—This species differs from *M. bicolorata* in the more slender body, larger eye, more numerous gill-rakers, more posterior origin of dorsal fin, and in the coloration.

Family Cynoglossidæ.

Cynoglossus (*Areliscus*) *carpenteri*, Alcock.

For synonymy and description see Norman, 1928, Rec. Ind. Mus. XXX, p. 196, fig. 11.

Occurrence :

St. 70, Gulf of Oman, OT, 196 m. ; 1 (160 mm.).

Distribution.—Persian Gulf, Gulf of Oman, Arabian Sea, Bay of Bengal ; in deep water.

Cynoglossus (*Areliscus*) *acutirostris*, sp. n.

Occurrence :

St. 194, Gulf of Aden, AT, 220 m. ; 18 (200–260 mm.). Holotype 215 mm.

Distribution.—Gulf of Aden ; in deep water.

Text-fig. 35.—*Cynoglossus* (*Areliscus*) *acutirostris*. Holotype. × $\frac{1}{2}$.

Description.—Depth of body $3\frac{1}{2}$ to nearly 4 in the length, length of head $3\frac{2}{3}$ to 4. Snout acutely pointed, length about $\frac{1}{2}$ that of head ; rostral hook short, extending about to below level of anterior margin of lower eye ; diameter of eye $9\frac{1}{2}$ to 10 in length of head ;

eyes narrowly separated, sometimes appearing almost contiguous, the upper distinctly in advance of lower; eye-balls scaly; maxillary extending to beyond eye, posterior edge much nearer to gill-opening than to end of snout. Two nostrils on ocular side, a simple one between the anterior edges of the eyes, a tubular one in front of lower eye. Dorsal *circa* 125. Anal *circa* 100. Scales more or less ctenoid on both sides of body; 100 to 105 in a longitudinal series; three lateral lines on ocular side, the upper and middle separated by 17 or 18 series of scales; no distinct lateral line on blind side. Brownish; sometimes with numerous rather indistinct small darker spots; opercular region blackish; dorsal, anal and caudal fins dark on both sides.

Remarks.—Related to *C. carpenteri*, Alcock, but differing in the longer and more acutely pointed snout, more numerous dorsal and anal rays, and in the somewhat smaller, ctenoid scales.

Cynoglossus (*Trulla*) *zanzibarensis*, sp. n.

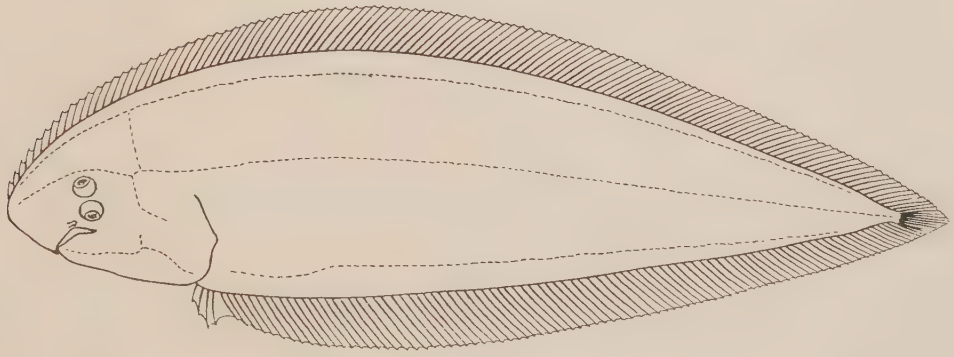
Occurrence:

St. 105, Zanzibar area, AT, 238–293 m.; 3 (150–180 mm.).

St. 106, Zanzibar area, AT, 183–194 m.; 3 (136–165 mm.). Holotype 165 mm.

Distribution.—Near Zanzibar; in deep water.

Description.—Depth of body $3\frac{3}{4}$ to 4 in the length, length of head $4\frac{1}{2}$ to $4\frac{3}{4}$. Snout rounded or obtusely pointed, length nearly 3 in that of head; rostral hook short, extending



Text-fig. 36.—*Cynoglossus* (*Trulla*) *zanzibarensis*. Holotype. × $\frac{3}{4}$.

to below mandibular symphysis; diameter of eye 7 to $7\frac{1}{2}$ in length of head; eyes narrowly separated, the upper in advance of the lower; maxillary extending to below middle of eye or a little beyond, posterior edge a little nearer to end of snout than to gill-opening. A single tubular nostril in front of lower eye. Dorsal 116–122. Anal 94–100. Scales ctenoid on both sides of body; about 75 in a longitudinal series; 3 lateral lines on ocular side, the upper and middle separated by 13 or 14 series of scales; no distinct lateral line on blind side. Brownish; without any definite markings.

Remarks.—Closely related to *C. sealarki*, Regan, differing mainly in the somewhat broader body, longer snout, and in the presence of ctenoid scales on the blind side of the body.

Symphurus marmoratus, Fowler.

? *Symphurus undatus*, Gilbert, 1905, Bull. U.S. Fish. Comm. XXIII (1903), p. 690, pl. xcviii.
Symphurus wood-masoni (*non* Alcock), Regan, 1908, Trans. Linn. Soc. Lond., Zool. XII, p. 235.
Symphurus marmoratus, Fowler, 1934, Proc. Acad. N.S. Philad. LXXXV (1933), p. 349, fig. 102.

Occurrence :

St. 153, Maldive area, TD 4, 256–293 m. ; 1 (116 mm.).

Distribution.—Near Maldives, Saya de Malha Bank, Philippines, Hawaiian Islands (?).

Remarks.—The depth of the body is 4 in the length (without caudal) in the present example, but in other respects it agrees closely with the type as described by Fowler. This was 98 mm. in length, and was from near Jolo Island at a depth of about 19 metres. On the blind side of the anterior part of the head there are a number of irregularly arranged rows of cutaneous sensory papillæ, similar in appearance to those found on the head in many genera of Gobiid fishes. These papillæ seem to be absent in the related species, *S. gilesii* (Alcock) and *S. wood-masoni* (Alcock), which also differ from *S. marmoratus* in having smaller scales. The two specimens from the Saya de Malha Bank, recorded by Regan as *Aphoristia wood-masoni*, differ from that obtained by the " Mabahiss " only in having the pelvic separated from the first anal ray by a greater distance, but, since the membranes connecting the rays of these fins have been largely torn away, this is not a reliable character. As described by Gilbert, *S. undatus*, from the Hawaiian Islands, differs from *S. marmoratus* in the somewhat deeper body and larger head, and in the rather larger eye, but this may well prove to be identical with Fowler's species.

Symphurus strictus, Gilbert.

Symphurus strictus, Gilbert, 1905, *t.c.*, p. 691, text-fig. 272 ; von Bonde, 1922, Fish. Mar. Biol. Surv. S. Afr. II (1921), Spec. Rep. I, p. 26 ; Barnard, 1925, Ann. S. Afr. Mus. XXI, p. 417.

Occurrence :

St. 145, Maldive area, AT, 494 m. ; 14 (55–134 mm.).

Distribution.—Off Delagoa Bay, S. Africa ; near Maldives ; Hawaiian Islands ; in deep water.

Remarks.—This species also exhibits the rows of sensory papillæ on the blind side of the head mentioned in *S. marmoratus*.

Symphurus macrophthalmus, sp. n.

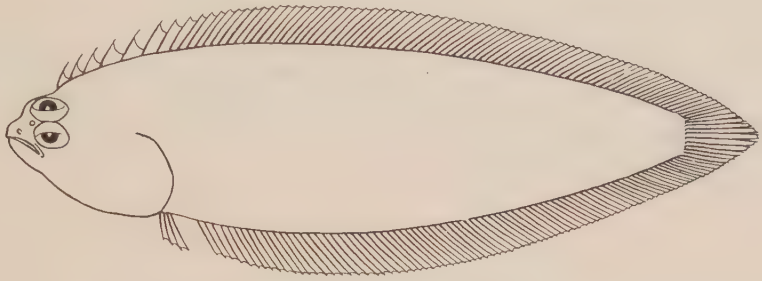
Occurrence :

St. 35, Gulf of Aden, OT, 457–549 m. ; 2 (105, 133 mm.). Holotype 133 mm.

Distribution.—Gulf of Aden.

Description.—Depth of body about $3\frac{3}{5}$ in the length, length of head 4. Snout shorter than eye, diameter of which is about 5 in length of head ; eyes contiguous, the upper very little in advance of the lower. Anterior nostril of ocular side a narrow tube, situated about midway between tip of snout and anterior margin of lower eye ; posterior nostril a wide low tube, situated between anterior margins of eyes. Blind side of head

with a number of irregularly arranged rows of cutaneous papillæ anteriorly ; nostrils ?. Cleft of mouth not much curved, extending nearly to below middle of lower eye. Scales ctenoid on both sides of body ; about 75 in a longitudinal, and about 38 in a transverse series. Dorsal 89. Anal 78. Pelvic 4-rayed, well separated from first ray of anal fin. Brownish, with narrow longitudinal darker streaks following the rows of scales ; lower side yellowish-white ; fins blackish on both sides.*



TEXT-FIG. 37.—*Symphurus macrophthalmus.* Holotype. × ¾.

REMARKS.—In the large size of the eyes this species differs from all other members of the genus except *S. fuscus*, Brauer, which may be distinguished, however, by the greater number of dorsal and anal rays, the smaller scales, the smaller head and the well-separated eyes.

Symphurus gilesii (Alcock).

For synonymy see Norman, 1928, Rec. Ind. Mus. XXX, p. 214, fig. 30.

OCCURRENCE :

St. 34, Gulf of Aden, AT, 1022 m. ; 14 (80–120 mm.).

St. 193, Gulf of Aden, AT, 1061–1080 m. ; 5 (60–115 mm.).

DISTRIBUTION.—Gulf of Aden, Bay of Bengal, Kei Islands.

REMARKS.—These specimens are all in rather poor condition, but appear to be referable to Alcock's species, which was previously unrepresented in the British Museum collection.

Symphurus wood-masoni (Alcock).

For synonymy see Norman, 1928, *t.c.*, p. 214.

OCCURRENCE :

St. 54, South Arabian Coast, AT, 1046 m. ; 1 (136 mm.).

DISTRIBUTION.—Coast of Arabia, Persian Gulf, Laccadive Sea, Bay of Bengal, Andaman Sea.

* Both the types of this new form are very badly preserved, and tend to come to pieces if handled at all roughly. Had the species not proved to be so markedly distinct from other known members of the genus *Symphurus* I should have hesitated to describe it as new. The above description is based upon the holotype only.

Family Triacanthidæ.*

Paratriacanthodes herrei, Myers.

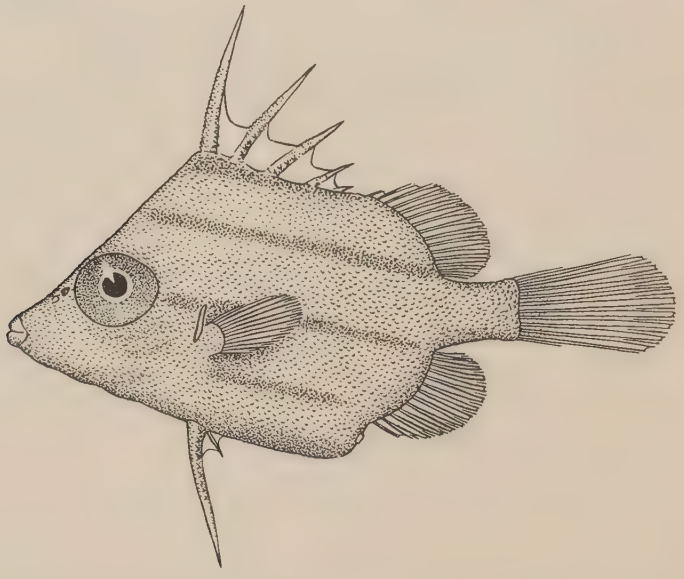
Paratriacanthodes herrei, Myers, 1934, Smithson. Misc. Coll. XCI, No. 9, p. 9.

Occurrence :

St. 106, Zanzibar area, AT, 183–194 m. ; 10 (38–58 mm.).

Distribution.—Near Zanzibar, Philippines ; in deep water.

Description.—Depth of body $1\frac{3}{4}$ to 2 in the length, length of head $2\frac{1}{2}$ to $2\frac{2}{3}$. Inter-orbital width $\frac{2}{3}$ diameter of eye, which is equal to length of snout and $2\frac{1}{2}$ in that of head Width of gill-opening $\frac{1}{2}$ diameter of eye. 10 small conical teeth in each jaw. Dorsal



Text-fig. 38.—*Paratriacanthodes herrei*. St. 106. × $1\frac{1}{2}$.

VI, 15 ; length of first spine $\frac{4}{5}$ that of head ; remainder decreasing in length ; last spine minute ; distance from base of first dorsal spine to nearest point on orbit $1\frac{1}{2}$ in length of head ; dorsal and pelvic spines with numerous small, straight asperities, but without recurved barbs. Anal 13. Pectoral with 12 rays. Greatest width of pelvis 4 times in its length, which is $3\frac{1}{2}$ in that of body ; pelvic spine as long as first dorsal spine, followed by a single short ray. Caudal rounded ; caudal peduncle $2\frac{2}{3}$ in length of head. Pale yellowish-brown ; side with 3 or 4 narrow longitudinal bands, the first running along the base of the spinous dorsal, the second from occiput to last rays of soft dorsal, and the third from eye to last rays of anal.

Remarks.—Through the courtesy of the United States National Museum, I have been able to compare these specimens with one of the paratypes of the species (U.S.N.M. Reg. No. 93302), 80 mm. in total length. Apart from the presence of the longitudinal bands, which are not apparent in the paratype, the specimens obtained by the " Mabahiss " differ only in having a somewhat shorter and deeper body, probably a juvenile character.

* I am much indebted to Mr. A. Fraser-Brunner for assistance in determining many of the specimens of Plectognathi obtained by the " Murray " Expedition.

This species was known previously only from deep water in the neighbourhood of the Philippines. The holotype (U.S.N.M. No. 93293), 73 mm. in standard length, was taken off Point Tagolo Light (8° 47′ N., 123° 31′ E.), at a depth of 332 metres.

Family Balistidæ.

Abalistes stellatus (Lacepède).

Occurrence :

St. 158, Maldive area, AT, 786–1170 m. ; 1 (41 mm.).

Distribution.—East Africa and the Red Sea, through the Indian Ocean and Archipelago, to the Pacific.

Balistapus sp.

Occurrence :

St. 108, Zanzibar area, AT, 786 m. ; 1 (29 mm.).

Canthidermis sp.

Occurrence :

St. 25, Gulf of Aden, hand-net, surface ; 2 (38, 39 mm.). Sargasso colony.

Remarks.—The coloration in life of these young fishes probably renders them very inconspicuous in the weed among which they habitually live, and the protective resemblance is, perhaps, enhanced by the membranous processes with which the body is ornamented. These processes are characteristic of the young of a number of Balistids, and it has proved impossible to identify specifically the present examples.

Family Monacanthidæ.

Cantherines melanoproctes (Boulenger).

Occurrence :

St. 24, Gulf of Aden, OT, 73–200 m. ; 1 (73 mm.).

Distribution.—Gulf of Aden, Coast of Arabia.

Remarks.—In this young specimen the anterior barbs of the dorsal spine are stronger than in type specimens (175 to 182 mm.) ; the typical broad bands are present along the back and the dark spot at the vent, but the cheek and side have bold patches and bars instead of vermiculations.

Cantherines modestoides, Barnard.

Cantherines modestoides, Barnard, 1927, Ann. S. Afr. Mus. XXI, p. 958.

Occurrence :

St. 24, Gulf of Aden, OT, 73–200 m. ; 1 (74 mm.).

Distribution.—Gulf of Aden ; Algoa Bay, South Africa.

Stephanolepis setifer (Bennett).

Occurrence :

St. ?, Gulf of Aden ? ; 2 (84, 89 mm.).

Distribution.—Tropical Atlantic and Indo–Pacific.

Aluterus scriptus (Osbeck).

Occurrence :

St. 25, Gulf of Aden, hand-net, surface ; 1 (79 mm.). Sargasso colony.

Distribution.—Tropical Atlantic and Indo-Pacific.

Family Ostraciontidæ.

Lactoria cornuta (Linnæus).

Occurrence :

St. 37, Gulf of Aden, OT, 18–22 m. ; 3 (20–35 mm.).

Distribution.—East Africa and the Red Sea, through the Indian Ocean and Archipelago, to Australia, Japan and the Pacific.

Rhinesomus gibbosus (Linnæus).

Occurrence :

St. 27, Gulf of Aden, OT, 37–91 m. ; 2 (215, 225 mm.).

Distribution.—East Africa and the Red Sea, through the Indian Ocean and Archipelago.

Family Tetrodontidæ.

Spheroides hypselogeneion (Bleeker).

Occurrence :

St. 37, Gulf of Aden, OT, 18–22 m. ; 1 (47 mm.).

Distribution.—East Africa and the Red Sea, through the Indian Ocean and Archipelago.

Canthigaster cinctus (Solander).

Occurrence :

St. 27, Gulf of Aden, OT, 37–91 m. ; 2 (68, 99 mm.).

Distribution.—East Africa, through the Indian Ocean and Archipelago, to the Pacific.

Family Diodontidæ.

Diodon holacanthus, Linnæus.

Occurrence :

St. 41, South Arabian Coast, hand-net, surface ; 1 (85 mm.). Sargasso colony.

Distribution.—All warm seas.

Family Lophiidæ.

Chirolophius mutilus (Alcock).

Lophius mutilus, Alcock, 1893, J. Asiat. Soc. Bengal, LXII (2), p. 179 ; 1894, Illust. Zool. " Investigator ", pl. x, fig. 2 ; 1899, Cat. Indian Deep-sea Fish. p. 54.
? *Lophius lugubris*, Alcock, 1894, J. Asiat. Soc. Bengal, LXIII (2), p. 118 ; 1895, Illust. Zool. " Investigator ", pl. xiv, fig. 1 ; 1899, Cat. Indian Deep-sea Fish. p. 55.
Lophius (*Chirolophius*) *quinqueradiatus*, Brauer, 1906, " Valdivia " Tiefsee-Fische, p. 313.
? *Lophius triradiatus*, Lloyd, 1909, Mem. Ind. Mus. II, p. 166 ; Illust. Zool. " Investigator ", pl. xlv, fig. 5.

Occurrence :

St. 35, Gulf of Aden, OT, 457–549 m. ; 2 (185, 200 mm.).

St. 115, Zanzibar area, OT, 640–658 m. ; 4 (140–335 mm.).

St. 194, Gulf of Aden, AT, 220 m. ; 11 (136–160 mm.).

Distribution.—Indian Ocean and Archipelago.

Description.—The diameter of the eye is equal to or somewhat less than the interorbital width and 5 to $7\frac{1}{2}$ in the length of the head (measured from tip of snout to upper angle of gill-opening). Edge of supraorbital ridge sometimes irregular, but usually with 3 blunt spines, which tend to become less conspicuous with age. Humeral spine with 3, 4 or 5 points in specimens up to 225 mm., but in the specimen of 335 mm. there is a single curved spine. Dorsal (III) IV–V, 7–9 ; all the rays of the spinous fin simple, the third longest, usually as long as or a little shorter than the head ; second part of spinous dorsal represented by one or two short rays, which may be variously reduced, hidden beneath the skin, or altogether wanting. Anal 5–6. Pectoral with 15 to 17 rays.

Remarks.—Examination of the above series of specimens, all of which appear to be referable to a single species, suggests that the form of the humeral spine and of the second part of the spinous dorsal fin is subject to greater variation than was formerly suspected, and that these characters may be of doubtful value in the discrimination of species in this genus. There appears to be very little doubt that Brauer's species is synonymous with *C. mutilus* (Alcock), and, although the eye would seem to be a little smaller and the number of pectoral rays is said to be only 13, *C. lugubris* (Alcock) may also prove to be identical.

The following young specimens probably belong here. They have only 3 rays in the spinous dorsal fin, and agree very closely with Lloyd's description and figure of *Lophius triradiatus*.

St. 35, Gulf of Aden, OT, 457–549 m. ; 2 (38, 43 mm.).

Family Antennariidæ.

Pterophryne histrio (Linnæus).

Occurrence :

St. M.B. II (*a*), Arabian Coast, RD, 11 m. ; 1 (15 mm.).

Distribution.—Atlantic and Indo-Pacific.

Antennarius sp.

Occurrence :

St. 25, Gulf of Aden, hand-net, surface ; 1 (12 mm.). Associated with sargasso colony.

St. 42, South Arabian Coast, hand-net, surface ; 2 (12, 13 mm.).

St. 44, South Arabian Coast, OT (?), surface ; 3 (16–19 mm.).

Remarks.—These specimens, belonging to at least two species, are all very small and cannot be specifically identified.

Family Chaunacidæ.

Chaunax pictus, Lowe.

Occurrence :

St. 105, Zanzibar area, AT, 238–293 m. ; 5 (45–105 mm.).

St. 109, Zanzibar area, AT, 640 m. ; 2 (73, 215 mm.).

St. 110, Zanzibar area, OT, 347–384 m. ; 4 (97–112 mm.).

St. 115, Zanzibar area, OT, 640–658 m. ; 19 (35–165 mm.).

St. 145, Maldive area, AT, 494 m. ; 2 (48, 140 mm.).

Distribution.—Atlantic and Indo-Pacific ; in deep water.

Remarks.—In this species the rostral tentacle (illicium) is rather short and thick, and somewhat enlarged and fimbriated at its apex ; it is always freely movable and depressible into a shallow naked area on the snout. As a rule the fimbriæ are pale or a little dusky, but in two specimens from the Atlantic and two from Natal, all in the British Museum collection, these are black above and white below, approaching the condition found in *C. pencillatus* (see below). In one or two of the specimens obtained by the present expedition the illicium is reduced in size, and in one example from Station 115 it is absent. In young and half-grown examples the upper parts and sides of the head and body are covered with rounded darker spots ; these become less distinct with age, and the adults are uniformly coloured.

The abdomen of *Chaunax*, like that of *Tetrodon* and its allies, is very distensible, and in specimens preserved in this condition one or both of the pelvic fins may be drawn inwards through the skin and appear at first sight to be reduced or absent. This was probably the condition in the specimen described by Lloyd as *Chaunax apus*.

Examination of the series of specimens obtained by the " Mabahiss ", together with those in the British Museum collection, suggests the possibility that the forms described as *C. fimbriatus*, Hilgendorf, *C. umbrinus*, Gilbert, and *C. endeavouri*, Whitley, are simply varieties of a single, widely-distributed species.

Chaunax pencillatus, McCulloch.

Occurrence :

St. 115, Zanzibar area, OT, 640–658 m. ; 7 (90–125 mm.).

Distribution.—Near Zanzibar ; Victoria, Australia ; in deep water.

Remarks.—This species is very close to the preceding, but differs especially in the form of the rostral tentacle (illicium), which has been well described and figured by

McCulloch (1915, Biol. Res. " Endeavour ", III, p. 167, pl. xxxiii, fig. 2). Further, the spines in the skin on the head region are larger and more shagreen-like than in *C. pictus*, and the markings on the back take the form of larger dark spots and rings. It is of interest to note that both the " Endeavour " and the " Mabahiss " obtained both forms *in the same haul*, and it seems possible that the differences mentioned above may be sexual : unfortunately, the gonads are not sufficiently well developed in the specimens from near Zanzibar to test this point.

Family Ogcocephalidæ.

Halieutæa coccinea, Alcock.

Occurrence :

St. 145, Maldive area, AT, 494 m. ; 7 (100–160 mm.).

Distribution.—Indian Ocean.

Remarks.—These specimens agree very closely with Alcock's original description of the species, which was not previously represented in the British Museum collection. The fine black vermicular lines on the upper surface are distinct in some specimens, scarcely apparent in others.

Halieutæa fumosa, Alcock.

Occurrence :

St. 194, Gulf of Aden, AT, 220 m. ; 2 (85, 95 mm.).

Distribution.—Gulf of Aden, Indian Ocean.

Dibranchus nasutus, Alcock.

Occurrence :

St. 184, Gulf of Aden, AT, 1270 m. ; 1 (66 mm.).

Distribution.—Gulf of Aden, Indian Ocean and Archipelago.

Dibranchus obscurus, Brauer.

Occurrence :

St. 34, Gulf of Aden, AT, 1022 m. ; 1 (42 mm.).

St. 118, Zanzibar area, AT, 1789 m. ; 1 (160 mm.).

St. 119, Zanzibar area, AT, 1207–1463 m. ; 1 (210 mm.).

Distribution.—Indian Ocean.

Remarks.—This species, which has not previously been figured, is new to the British Museum collection.

Dibranchus nudiventer, Lloyd.

Occurrence :

St. 118, Zanzibar area, AT, 1789 m. ; 1 (67 mm.).

Distribution.—Indian Ocean.

Remarks.—This young specimen appears to be referable to this species, known previously only from the type, 75 mm. in length, from the Bay of Bengal.

Cœlophrys micropus (Alcock).

Occurrence :

St. 34, Gulf of Aden, AT, 1022 m. ; 2 (40, 60 mm.).

Distribution.—Indian Ocean and Archipelago.

Remarks.—As pointed out by Radcliffe (1912, ' Proc. U.S. Nat. Mus.' XLII, p. 212), this species is referable to the genus *Cœlophrys*, which is, however, doubtfully distinct from *Dibranchus*.

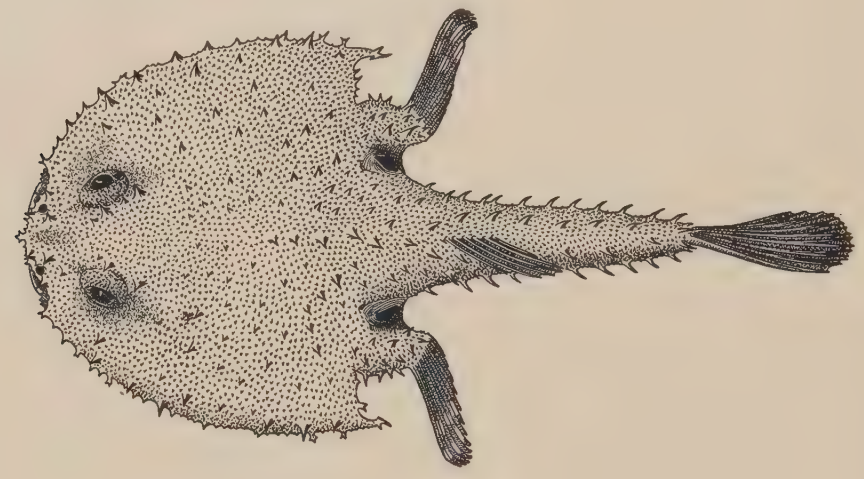
Malthopsis triangularis, Lloyd.

Occurrence :

St. 145, Maldive area, AT, 494 m. ; 1 (38 mm.).

Distribution.—Indian Ocean.

Remarks.—The differences between this species and the related *M. luteus*, Wood-Mason and Alcock, have been clearly shown by Sewell (1914, ' Rec. Ind. Mus.' X, p. 132).



Text-fig. 39.—*Dibranchus obscurus*. St. 119. × ¾.

Halicmetus ruber, Alcock.

Occurrence :

St. 35, Gulf of Aden, OT, 457–549 m. ; 1 (40 mm.).

St. 145, Maldive area, AT, 494 m. ; 2 (29, 47 mm.).

Distribution.—Indian Ocean and Archipelago.

Family Melanocetidæ.

Melanocetus johnsoni, Günther.

Occurrence :

St. 121, Zanzibar area, AT, ? m. ; 1 (29 mm.).

St. 172, Arabian Sea, N 200, 2091–0 m. ; 1 (23 mm.).

Distribution.—Atlantic, Indo-Pacific.

Melanocetus sp.

Occurrence :

St. 172, Arabian Sea, N 200, 2091–0 m. ; 1 (25 mm.).

Remarks.—This specimen has some very long fangs in the lower jaw. The distal part of the illicium is missing.

Family Oneirodidæ.

Dolopichthys sp.

Occurrence :

St. 186, Gulf of Aden, N 200, 952–0 m. ; 1 (22 mm.).

St. 193, Gulf of Aden, AT, 1061–1080 m. ; 1 (27 mm.).

Remarks.—Both these specimens, which appear to represent distinct species, are in rather poor condition, and as far as the form of the illicium is concerned cannot be

Text-fig. 40.—Distal part of illicium of *Dolopichthys* from St. 193.

Text-fig. 41.—Distal part of illicium of *Dolopichthys* from St. 186.

exactly identified with any of the species described by Regan and Trewavas (1932, 'Rep. Carlsberg Ocean. Exped.' 1928–30, II). I have given a figure of the distal part of the illicium of each of these specimens here, but have been loath to add further names to the already long list of species in this genus.

Chænophryne sp.

Occurrence :

St. 172, Arabian Sea, N 200, 2091–0 m. ; 1 (15 mm.).

Remarks.—The distal part of the illicium has been broken off, so that it is quite impossible to determine the species of this small specimen.

Family Ceratiidæ.

Cryptosparas carunculatus (Günther).

Occurrence :

St. 172, Arabian Sea, N 200, 2091–0 m. ; 1 (100 mm.).

Distribution.—Arabian Sea, Japan ; in deep water.

Remarks.—This specimen differs from the type of the species, 35 (28 + 7) mm. in total length, in having the pore in front of the caruncles at the end of a short, stout papilla, but this difference may well be a matter of age. The length of the illicium is about $\frac{2}{7}$ that of the fish as in the type, and the structure of the bulb of the illicium is very similar.

The following very young examples probably belong here :

St. 172, Arabian Sea, N 200, 2091–0 m. ; 1 (15 mm.).

St. 186, Gulf of Aden, N 100, 600–0 m. ; N 200, 952–0 m. ; 2 (each 16 mm.).

Mancalias uranos ›pus (Murray).

Occurrence :

St. 172, Arabian Sea, N 200, 2091–0 m. ; 1 (18 mm.).

Remarks.—The bulb of the illicium is more heavily pigmented than is usually the case in this species.

Distribution.—Atlantic, Indo-Pacific.